***United States Court of Appeals***

***for the Second Circuit***

# APPENDIX

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NO. 74-2284 et al.

NOS. 74-2284, 74-2286, 74-2308, 74-2450, 74-2449

JOINT APPENDIX TO THE BRIEFS

VOLUME XI

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IN THE UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT

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THE SOCIETY OF THE PLASTICS INDUSTRY, INC.,

HOOKER CHEMICALS & PLASTICS CORP.,

UNION CARBIDE CORPORATION,

TENNECO CHEMICALS, INC.

and

AIR PRODUCTS AND CHEMICALS, INC.,

Petitioners,

v.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION,
UNITED STATES DEPARTMENT OF LABOR;
PETER J. BRENNAN, SECRETARY, DEPARTMENT OF LABOR;
and JOHN H. STENDER, ASSISTANT SECRETARY
FOR OCCUPATIONAL SAFETY AND HEALTH,

Respondents.

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On Petition For Review Of An Order Of
The Occupational Safety and Health Administration,
United States Department of Labor

UNITED STATES COURT OF APPEALS
FILED
DEC 10 1974
SAMUEL FUSARO, CLERK
SECOND CIRCUIT

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3002

WORKING NOTES OF SPI

KEPNER-TREGOE CONFERENCE

FINDINGS OF THIS GROUP ARE SUMMARIZED ON PAGES 52 THROUGH 55 (TOP HALF) AND 62.

# THE SITUATION

1ST PERSON: SPI COMMITTEE ON VC HEALTH

SITUATION: OSHA HAS PROPOSED A STANDARD FOR VC EXPOSURE OF NO DETECTABLE LIMIT (BY TEST ± 1 PPM SENSITIVITY)

SPI PREPARE A PRESENTATION FOR THE OSHA HEARING 6/25.

PRIORITY:

VALUE: VC INDUSTRY SURVIVED, 2M JOBS - USA.

TIMING: DEADLINE 6/25

NOMINAL RESULT

CONVINCE OSHA THAT PROPOSED STANDARD IS ~~UNTANABLE~~ OR (OVERKILL) UNNECESSARY.

OR

DEFINE A SUPPORTABLE "INDUSTRY POSITION FOR VC LEVELS.

ANALYTICAL APPROACH

A. ESTABLISH FACTUAL DATA + ANALYSIS OF VC HEALTH EXPERIENCE.

B. DEVELOP STRATEGY OBJECTIVES (+ ALTERNATIVES)

## PRESENT SPI POSITION

| | | |
|---|---|---|
| 10/5/74 | 40 PPM | CEILING |
| | 25 | TWA |
| 10/5/7 | 25 | C |
| | NONE | TWA |
| 10/5/76 | 25 | C |
| | 10 | TWA |

BASIS: "THE BEST WE CAN DO"

(AVG. INDUSTRY POSITION)

ANGIOSARCOMA

| | IS | IS NOT |
|---|---|---|
| WHAT | ANGIOSARCOMA | (CANCER OF CELLS OTHER THAN BLOOD VESSELS) |
| | LIVER | OTHER ORGANS |
| | GOODRICH - 5 DEATHS<br>SMA 12 TESTS 2 LIVING<br>(LOUISVILLE)<br>PVC 30 YEARS | VCM CALVERT CITY - 20+<br>PVC LONG BEACH - 14 YRS.<br>PVC AVON LAKE - 20 YRS.<br>PVC HENRY - 17 YRS.<br>PVC PEDRICKTOWN - 4<br>NIAGARA (PVC + VCM) - 30 YRS |
| | GOODYEAR - 3 DEATHS<br>NIAGARA 28 YRS.<br>(BOTH PVC + VCM) | PLAQUEMINE - 5 YRS.<br>PVC |
| | FIRESTONE - 1 DEATH<br>PVC POTTSTOWN - 27 YRS. | PERRYVILLE, MY. - 6 YRS.<br>PVC |
| | UNION CARBIDE - 1 LIVING<br>SO. CHARLESTOWN 1 DEATH<br>PVC + VCM 39 YRS. | TEXAS CITY - 26 YRS.<br>VCM + PVC |

## VC RESULTS

(1) ANGIOSARCOMA

INCREASED INCIDENCE OF OTHER MALIGNANCY
- MOUTH
- LUNG
- LYMPH
- BRAIN

FROM STATISTICAL MORTALITY ANALYSIS ON VC EMPLOYEES

---

POSSIBLE REDUCTION IN PULMANARY FUNCTION

LIVER DYSFUNCTION (POSSIBLE)

---

(2) AOL - (BONES) EXPERIENCE THAT STARTED INVESTIGATION

| | IS | IS NOT |
|---|---|---|
| WHAT (CONT'D.) | OTHER REPORTED: 1931 + 10 IN CONNECTICUT OF WHICH 2 in PVC | AREAS OF NEGATIVE EXPOSURE: |
| | FABRICATORS | VCM |
| | 1 - ACCOUNTANT ROSS & ROBERTS IN OFFICE | GENERAL TIRE - OHIO 20 YRS. |
| | 1 - G.E. EXTRUDER OPERATOR | ETHYL (BATON ROUGE) 16 YRS. |
| | | HOUSTON 12 YRS. |
| | | CONOCO - LAKE CHARLES '68 |
| | | UNIROYAL - PAINESVILLE, OHIO 14 YRS. DOWN 12 YRS. |
| | | DIAMOND SHAMROCK, |
| | | DEER PARK, TEXAS 15 YRS. DOWN 5 YRS. |
| | | DELAWARE CITY 8 YRS. |
| | NIAGARA | PVC |
| | WOMAN LIVES 1/2 MILE FROM GOODYEAR PLANT AND 1/4 MILE FROM FORMER GOODRICH PLANT. PREVAILING WIND AWAY FROM HOME 85% OF TIME. | AIR PRODUCTS, CALVERT CITY, KENTUCKY AND PACE, FLORIDA |
| | | ETHYL (BATON ROUGE) 9 YRS. |
| | | UNIROYAL - PAINESVILLE, OHIO 26 YRS. |
| | | DIAMOND SHAMROCK, |
| | | DEER PARK, TEXAS 20 YRS. |
| | | CONOCO (ABERDEEN) |
| | FOREIGN: | 3 PLANTS '63-'65 |
| | GB - ICI | '68-'69 |
| | | OKLAHOMA CITY '71 |
| | FOR ( 6 CASES) | ROBINTECH, PAINESVILLE, OHIO 7 YRS. |
| | | OLIN - ASSONET, MA. 9 YRS. |
| | | PANTASOTE - PASSAIC, N.J. 18 YRS. |
| | | POINT PLEASANT, W. VA. 9 YRS. |

| IS | IS NOT |
|---|---|
| WHAT (CON'T) | NEGATIVE EXPOSURE |
| | GREAT AMERICAN, FITCHBURG, MA. - 18 YRS. |
| | MONSANTO, SPRINGFIELD, MA. - 26 YRS. |
| | MVC - TEXAS CITY - OP. - 15 YRS. |
| | DOWN - 9 YRS. |
| | AIR PRODUCTS |

(NOT REPRESENTED)

TENNECO (VCM + PVC)

ALLIED - VCM

KEYSER - PVC

STAUFFER - PVC

NAT. STARCH - PVC

AMERICAN CHEMICAL - (VCM + PVC)

BORDEN - PVC

DOW - (VCM + PVC)

SHELL)
) VCM
PPG )

MONOCHEM - VCM

| IS | IS NOT |
|---|---|
| WHAT (CONT'D.) | GOODRICH: |
| | PILOT PLANTS |
| | PROCESS LAB (1 AOL CASE) |
| | GOODYEAR: |
| | RESEARCH, ETC. |
| "UNCOMMON" | FIRESTONE |
| IRVING SELIKOFF | PILOT PLANT |
| | DIAMOND SHAMROCK AND OTHERS |
| | PILOT PLANTS |
| | ETHYL - RESEARCH |
| | GOODYEAR |
| | PROCESS CONTROL LAB |
| | (HIGH EXPOSURE) |
| | (1 - AOL CASE) |
| | MONSANTO |
| | ETHYLENE VINYL CHLORIDE PLANT |
| | TEXAS CITY (10 YEARS) |

| | IS | IS NOT |
|---|---|---|
| WHEN | AVERAGE FROM EXPOSURE TO DEATH USA = 19.6 YRS<br><br>MINIMUM 14 YRS. | LESS |
| EXTENT | NO KNOWN CURE BUT 1 GOODRICH CASE RETURNED TO WORK "GOOD" - 20 YRS. END OF FEB.<br>DIAGNOSIS OUT ON 1 OF 4 LIVER TESTS.<br><br>OTHER "OUT" ON 3 OF 4 LIVER TESTS.<br><br>ALL OTHERS DIED SOON AFTER DIAGNOSIS (2-3 MONTHS)<br><br>1 - EARLY CARBIDE DIAGNOSIS (SURGICAL EXPLORATION) STILL LIVING | DR. CREECH (AMA 6/10/74) STATEMENT:<br>"BOTH PATIENTS UNDERGOING CHEMOTHERAPY FOR ANGIOSARCOMA, HAVE SHOWN IMPROVEMENT" (GOODRICH) |

| IS | IS NOT |
|---|---|
| WHAT (CONT'D.) | GOODRICH: PILOT PLANTS PROCESS LAB (1 AOL CASE) |
| | GOODYEAR: RESEARCH, ETC. |
| "UNCOMMON" IRVING SELIKOFF | FIRESTONE PILOT PLANT |
| | DIAMOND SHAMROCK AND OTHERS PILOT PLANTS |
| | ETHYL - RESEARCH |
| | GOODYEAR PROCESS CONTROL LAB (HIGH EXPOSURE) (1 - AOL CASE) |
| | MONSANTO ETHYLENE VINYL CHLORIDE PLANT TEXAS CITY (10 YEARS) |

| | IS | IS NOT |
|---|---|---|
| WHERE | 1 ALLEDGED BEAUTY SHOP CASE ( 20 YRS. EXPOSURE) BUT USE OF AEROSOL DENIED BY SHOP. | NO KNOWN REPORTS OF CASES FROM MANUFACTURING OR USE OF VC PROPELLANTS. |
| WHEN | AMA JOURNAL 6/10/74<br>SUSPECT ANGIOSARCOMA -<br>AFTER 2-1/2 YRS. EXPOSURE<br>(GERMAN SOURCE) | |

SOURCES SPONTANEOUSLY - MICE

REPORT 15% and 5%
DIFFERENT STRAINS

REPORT
HUMAN
+ ANIMALS

- (VC
- (ARSENIC COMPOUNDS -
- ( INSECTICIDES
- ( VINEYARDS (GERMAN)
- ( MINING ARSENIC
- ( (PORTUGAL)
- (THOROTRAST
- ANIMAL SAFROLE
- " PHENOL HYDRAZINE
- " NITROSO DIMETHYL AMINE
- " DIMETHYL HYDRAZINE
- " ETHYL HYDRAZINE
- " METHYL HYDRAZINE

HUMAN?
NO REPORTS

| IS | IS NOT |
|---|---|
| MCA (BIO TEST) ANIMAL TESTS<br>7 MONTHS AT 50 PPM<br>7 HRS./DAY<br>5 DAYS/WK.<br>3 FEMALE<br>1 MALE<br>NO FOOD OR WATER DURING EXPOSURE. | NO RATS OR HAMPSTERS CONTRACTED ANGIO IN THIS TEST.<br>200 SAMPLES, LESS 4 ANGIO, LESS UNDETERMINED "DROPOUTS" FOR OTHER REASONS |
| 7 MONTHS AT 200 PPM<br>7 HRS. - 5 DAYS MORE?<br>2500 PPM<br>MORE STILL?<br>TOTAL 29 CASES FOR ALL 3 LEVELS<br>PREPONDERANCE OF FEMALES - ALL LEVELS | NO OBSERVED TUMORS IN RATS OR HAMSTERS<br>(STATUS OF LIVING ANIMALS NOT KNOWN, TESTS ON DEAD ONLY) |

INDUSTRIAL BIOTEST MOUSE DATA (VCM)

MORTALITY (ALL CAUSES LESS CANCER)

| CONCENTRATION | MALE | FEMALE | TOTAL |
|---|---|---|---|
| 0 | 16 | 5 | 21 |
| 50 PPM | 31 | 9 | 40 |
| 200 " | 7 | 13 | 20 |
| 2500 " | 18 | 13 | 31 |

CANCERS (DEATH)

| | NEOPLASM | | ANGIOSARCOMA |
|---|---|---|---|
| 0 | 0 | | 0 |
| 50 PPM | 4 | OF WHICH | 2 |
| 200 " | 6 | | 4 |
| 2500 " | 19 | | 17 |

| IS | IS NOT |
|---|---|
| MALTONI STUDY | |
| 4 HRS./DAY, 5 DAY/WK. | |
| VINYL CHLORIDE 50 PPM | VINYL ACETATE 2500 PPM |
| DIED WITH ANGIOSARCOMA-- | NO CASES ON |
| BUT NOT BECAUSE OF | DIED BECAUSE OF ANGIO |
| 3 RATS - 1 TYPE + | |
| 1 LIVER ANGIO | |
| 1 PERITONAL " | |
| 1 NEPHROBLASTOMA (KIDNEY) | |
| TYPES - SPAGUE-DAWLEY | |
| - WISTER | |
| (LOWER INCIDENCE IN COMPARISON AT 63 WKS.) | |
| 250 PPM | |
| (15?) DIED BECAUSE OF | |
| MORE AT HIGHER CONCENTRATIONS. | |
| MORTALITY CROSSOVER AT 2500 PPM, | |
| ANIMALS DYING OF ZYMBAL CELL | |
| CANCER (DON'T LIVE LONG ENOUGH TO | |
| DIE OF ANGIO). | |

"DISTINCTIONS"

DEDUCTIONS ABOUT THE NATURE OF THE CAUSAL MECHANISM.

---

ANGIOSARCOMA OF LIVER = CANCER OF BLOOD VESSEL CELLS OF THE LIVER.

LIVER IS THE MOST RESISTENT ORGAN TO CANCER.

LUNGS PRESUMABLY SEE THE VC EXPOSURE 1ST BUT ARE UNAFFECTED.

LIVER HAS HIGH CONCENTRATION OF BLOOD VESSELS

(ALSO LUNGS, KIDNEYS, SPLEEN)

(IF VC INGESTED, 1ST MAJOR ORGAN = LIVER)

LIVER IS A DETOXIFIER OF POISONS

CHEMICALLY CHANGES

IN DETOXIFYING, LIVER HAS HIGHER LEVEL OF TOXIN CONCENTRATION AND METABOLITES.

LIVER IS A TARGET OF CHLORINATED HYDROCARBONS --

VC IS AN ALKYLATING AGENT.

ONE THEORY OF CANCER FORMATION IS THE PRESENCE OF ALKYLATED DNA OR RNA OR PROTEIN MOLECULE WHICH RESULT IN GENERATION OF CANCER CELLS.

VCM - PHYSICALLY ADSORBS TO PVC RESINS - WATER
(AND PRODUCTS CARRY)

MALTONI REPORTED NO PVC IN CANCEROUS ORGANS.

VC PRESENT IN "FATALITY" BLOOD AND TISSUES TO SEVERAL M PPM.

(SUSPECTED "SNIFFER" WAS AN ALCOHOLIC)

SNIFFING SAID TO BE RAMPANT IN ALL PLANTS BUT NOT CONFIRMED -- SNIFFERS FREQUENTLY ARE ALCOHOLICS.

DR. ALEX SABLE

VINYL PEROXIDE CAN BE DECOMPOSED TO HCL, CO, HCHO, $H_2O$ + LIVER TISSUE PRODUCES BISCHLOR METHYL ETHER (ONE OF 14 CARCINOGENS) BUT NO REFERENCE TO ASSOCIATION WITH LIVER ANGIOSARCOMA.

PRINCIPALLY A LUNG PHENOMENON THROUGH RESPIRATORY EXPOSURE.

---

"PRESUME" THAT TOXINS TRANSFER INTO LIVER FOR DETOXIFICATION PROCESS. HOWEVER, LIVER DOES SECRETE KNOWN ENZYMES NORMALLY, AND ABNORMALLY WHEN STIMULATED BY "DAMAGE" TO BODY.

(CONT'D.)

NOT KNOWN WHETHER PRESENCE OF VC IN BLOOD ACCOMPANIED BY HIGH LEVEL OF ANY ENZYMES.

GOODRICH: 24 PEOPLE REMOVED FROM EXPOSURE DUE TO SMA - 12 TESTED

INCLUDED 12 TESTS, ESPECIALLY 4 = SGOT
LDH
AP
B

LESSER TOTAL PROTEIN, CHLORESTEROL

---

ENZYMES OF GENERAL TYPE OF COMPOUNDS SUBJECT TO ALKYLATION.

? SITE OF REACTION AND DERIVATIVES.

4322

## CASE HISTORIES -- LOCATIONS

GOODRICH - ALL AT LOUISVILLE

NO SIGNIFICANT PROCESS DIFFERENCES PARTICULARLY WITH NIAGARA.

BOTH USE $VCL_2$, SAME CATALYST, SAME RAW MATERIALS OVER EQUIVALENT HISTORY,

PROBABLY MORE TIME IN REACTOR AT LOUISVILLE.

JOB SIMILAR EXCEPT POSSIBLY LESS CLEANING AT NIAGARA.

BOTH "POORLY" VENTILATED.

1 LIVING CASE HAS MINIMUM EXPOSURE TO $VCL_2$.

ALL CASES STARTED OUT CLEANING REACTORS.

LOUISVILLE - 3 FLOORS VS. 2 NIAGARA

OPERATING PROCEDURES - LOUISVILLE AND AVON LAKE

START CLEANING IMMEDIATELY, REGULATED EXPOSURE BY "COLD BALLS" (OTHER COMPANY PLANTS, "TINGLING", "BURNING")

NO INTERVIEWS AT NIAGARA.

ALL VC ( INDUSTRY) FROM ACETYLENE PRIOR TO '66 (APPROX.)

LOUISVILLE USED BLOWDOWN TANKS VS X NIAGARA.

PLYCLEANERS AT LOUISVILLE EXCLUSIVELY CLEANED --
OTHER CHORES AT NIAGARA

USE OF BLOWDOWN TANKS, MAY LEAVE MORE RESIDUAL MONOMER IN REACTOR AT TIME OF CLEANING.

ALSO NIAGARA STRIPPED WITH COMPRESSOR VS. EVACUATION WITH EJECTOR AT LOUISVILLE LESS FREE VC AT NIAGARA

TURNOVER FASTER AT LOUISVILLE,
MORE FREQUENT OPERATOR EXPOSURE.

--- SOME SHORTCUTS - IMMEDIATE ENTRY WITH EVACUATION HOSE (FROM BOTTOM).

--- LATE 50's ADDED BLOWER TO DISCHARGE. VAPORS THROUGH ROOF, PREVIOUSLY DISCHARGED TO OPERATING FLOOR.

--- IMPRESSION OF LESS MONOMER ODORS AT NIAGARA.

RECENT ATTEMPT TO REPRODUCE OLD CONDITIONS LOUISVILLE AFTER EVACUATION 15 MINUTES.

LEVEL = 60 - 110 PPM IN REACTOR

---

GOODYEAR HAS OBSERVED THAT VC LEVEL TENDS TO RISE DURING CLEANING (TRAPPED MONOMER).

---

READINGS AT GOODRICH 1964 - SAMPLES

120 TO 150 PPM WHILE CLEANING.

ALSO 25 PPM $VCL_2$.

---

SOME REPORTED GETTING DIZZY )
) THEN GET OUT
OTHERS REPORTED GETTING SICK)

---

SOMETIMES MAY NOT HAVE POSITIONED HOSE AT BOTTOM.
OTHER TIMES REMOVE HOSE DURING REMVAL OF SOLIDS FROM REACTOR.

INITIAL INVESTIGATION PROMPTED BY POSSIBILITY OF AOL AT AVON LAKE.

'68, '69 FOUND HIGHER MONOMER LEVELS AT AVON LAKE

? 150 - 200 PPM VS. 5 - 10

AT LOUISVILLE.

HEPATITIS EPIDEMIC AT LOUISVILLE.

INTERVIEW QUESTION AT LOUISVILLE AND AVON LAKE INDICATED THAT INTENSITY OF EXPOSURE WAS SIGNIFICANTLY HIGHER AT LOUISVILLE THAN AT AVON LAKE (BASED ON REACTIONS, SENSING, ETC.)

---

SLURRY TANKS - NO DISTINCTION

LOUISVILLE MADE $VCL_2$, AVON LAKE DIDN'T

SEPARATE BUILDING AT LOUISVILLE

LOUISVILLE MAKES PASTE RESIN, AVON LAKE MAKES
HENRY MAKES, FREDRICKTOWN MAKES,
NIAGARA DOES NOT MAKE

LOUISVILLE MADE OWN MVC MANY YEARS, DID NOT UNLOAD,
AVON LAKE UNLOADED.

GOODYEAR

| NIAGARA | VS. | PLAQUEMINE |
| --- | --- | --- |
| MADE VCM FOR 21 YRS. | | FROM DOW |
| EMULSION PROCESS | | MASS POLY |
| SUSPENSION PROCESS | | |
| VC FROM ACETYLENE AND HCL | | |

INCIDENCE NOT NECESSARILY RELATED TO REACTOR CLEANING.

USE BLOWDOWN AND STRIP.

REACTOR PURGING SIMILAR TO LOUISVILLE -- INTO ROOM UNTIL RECENTLY, NOW VENTED TO OUTSIDE.

AT NIAGARA

NO $VCL_2$

JOB ASSIGNMENTS:

REACTOR CLEANING -- MORE WHEN THEY ENTER WORK FORCE.

SOME STAY IN CREW.

APPROXIMATELY 1/3 JOBS ARE "BID" AND DO NOT INVOLVE REACTOR CLEANING.

NO REPORTED "COLD BALLS".

VC LEVELS MEASURED IN REACTOR

MAXIMUM = 325 PPM (1968)

AIR REACTOR 15-20 MINUTES PRIOR TO ENTRY - FIRM.

HOSE TO BOTTOM, QUESTIONABLE COMPLIANCE KEEPING HOSE IN DIFFICULT TO ENFORCE.

GOODYEAR INTERVIEW DATA

BY MANAGER OF QUALITY CONTROL, 6 MEN/TIME

24 LONG SERVICE MEN, 15-28 YEARS.

CALCULATED TWA'S FROM STATEMENTS

| | | |
|---|---|---|
| OLD VCM BUILDING | - | 496 PPM |
| NEW VCM BUILDING - 10 YEARS | - | 141 " |
| OLD PVC BUILDING | - | 502 " |
| NEW PVC BUILDING | - | 154 " |
| PACKAGING AND DRYING | - | 8 " |

---

96% SAID THEY SMELLED VC.

3% SAID NO.

1/3 DETECTED OVER 1/2 THE TIME.

50% SAID "DIZZY WHILE CLEANING.

ALL SAID "DIZZY" SOMETIME.

ONE SAID UNCONSCIOUS (BUT NOT SPECIFIC).

NONE EVER HOSPITALIZED.

4630

MOST OF THEM "ATE ON THE JOB"

ALL SAID "NOT LIKE IT USED TO BE"

---

GOODYEAR - MEAGER EARLY DATA

(BY INSTRUMENTS)

---

MANY IMPROVEMENTS TO REDUCE EXPOSURE.

--- HIGHER STRIPPING TEMPERATURES

--- MANY VENTILATION ITEMS, SEALS, ETC.

--- FOUND MANY UNSUSPECTED AREAS THAT NEEDED VENTS

--- HAVE LAB TECHNICIANS MEASURE ENVIRONMENT LEVELS 1 HOUR AND HUNT LEAKS REST OF SHIFT

--- STILL HAVE "EXCURSIONS" ABOVE 50 PPM 1 OR 2/SHIFT

--- DON'T KNOW HOW TO PREVENT EXCURSIONS BUT HAVE MASKS AVAILABLE.

---

FIRESTONE - POTTSTOWN (1 DEATH)

1 DEATH FROM ANGIO OUT OF 13 AS REVEALED BY REVIEW OF SLIDES.

ALWAYS PURCHASE MVC.

MAKE PASTE RESINS, SUSPENSION HOMOPOLYMERS, AND SUSPENSION COPOLYMERS.

USE BLOWDOWN TANKS.

DO NOT ENTER AND CLEAN - EVERY BATCH, DO EVERY 10-15 BATCHES.

OLD PROCEDURE:
ENTERING PROCEDURE:

DISCONNECT ALL INLETS.

ALWAYS BLOW AIR IN OVER MAN.

EXIT THROUGH VESSEL OPENINGS INCLUDING BOTTOM.

PREVIOUS DRAWN DOWN WITH COMPRESSOR.

VENTILATION WAS 10 AIR CHARGES PER HOUR,
NOW 10 TO 20 BACK THROUGH '54 AT LEAST.

4032

OLD PROCEDURE

REACTOR TESTED FOR EXPLOSION LIMITS BEFORE ENTERING.

NO "COLD BALLS" COMMENTS

---

NO SURVEYS OF OPINIONS TAKEN.

---

CHANGE NEW PROCEDURE LAST 1/4 '72

REACTOR PURGED BY BLOWING AIR INTO IT.

EVACUATION THROUGH DROP HEADER AND EXIT OUTSIDE BUILDING.

---

STARTED 1961 REACTORS FLUSHED BETWEEN BATCHES INCLUDING EVACUATION ABOVE.

---

DURING FLUSHING, OPERATOR COULD BE EXPOSED TO HIGH LEVELS IF PROCEDURE NOT PROPERLY FOLLOWED.
(MONSANTO - NOTED SEVERAL M PPM TO EXPLOSION RANGE)
GOODYEAR MOVED HEAD TO AVOID FUMES.

1 MAN "PASSED OUT" ON RINSING AND REMOVED FROM OPERATION.

(DIAMOND SHAMROCK HAS FOUND SIMILAR INCIDENTS)

---

CARBIDE SOUTH CHARLESTON

DISTINCTION VS. TEXAS CITY

VCM STARTED 1935
DISCONTINUED 1968
PVC - SOLVENT AND DISPERSION
AND $VCL_2$ UNIT

EMPLOYEES HIRED IN LOW AND WORKS UP (FROM CLEANING)

TEXAS CITY
1948-1969

SOLVENT/NON-SOLVENT AND SUSPENSION RESIN

MAIN EXPOSURE LABOR CLEANS, OPERATORS HIRE IN AS SUCH.

## SOUTH CHARLESTOWN

?

UNDERSTAND DO NOT STEAM.

WASH AFTER EACH BATCH.

MANUALLY CLEAN 5TH TO 10TH BATCH.

PRE '72 - AIR PURGE ONLY, NO VENTILATION DURING CLEANING.

WENT IN ACCORDING TO SMELL.

POST '72 + BLOWER AT TOP AND AND BOTTOM OPEN - EVACUATE TO OUTSIDE.

12 VENTILATION AIR CHARGES/HR.

CONTROL ROOM MAXIMUM 6 PPM.

COMPRESSOR ROOM HIGH BUT NO FIGURES.

OPERATORS EAT IN CONTROL ROOM.

R. HULL --

"WHERE (1 CASE) WORKED COULD SMELL VC MOST OF TIME."

3700 - 4600

3000 GAL. REACTOR

PRESENT PROCEDURE

STEAM SINCE MARCH, TEST TO BELOW 1 PPM. CLEANERS WEAR AIR RESPIRATOR.

MONITOR DATA BACK TO '69. LEVELS OVER 400 PPM. NOW EXPECT EXCURSIONS OVER 50 AND REQUIRE RESPIRATORS.

## TEXAS CITY

4031

HAVE BLOWDOWN TANKS

(IN SUSPENSION OPERATION)

---- SOLVENT AND SUSPENSION: RARELY ENTERED.

NON-SOLVENT ENTERED OCCASIONALLY AFTER STEAMING.

PROBABLY AFTER 1967

EST. TWA 10-25 TWA

WATER WASH, TOP BLOWER.

ENTER AFTER ?

TIME

VERY LITTLE PROCEDURE KNOWN BEFORE 1967 BUT EST. TWA 25-50.

6000 GAL.

TXC - MOSTLY AN "OPEN" PLANT CONSTRUCTION

FOUND NO CASES OF AOL OR ANGIO

VC EXPOSURE GROUP - 24 DEATHS -- 1 HAD (ALCOHOLIC) CIRRHOSIS OF LIVER CONFIRMED AS NOT CANCER 6/18

1 HAD CANCER OF PANCREAS - METASTEVCISED TO LIVER

1 HAD LYMPHO SARCOMA OVER ENTIRE BODY

73 LABORERS ALL LIVING, NO LIVER SYMPTOMS

SOUTH CHARLSTON:

DEATH WAS CONFIRMED ANGIO

STILL LIVING ORIGINALLY DIAGNOSED AS ADENOCARCINOMA, LATER AS "PROBABLY" ANGIO FROM BIOPSY.

IS-NOT INCIDENCE DATA:

AIR PRODUCTS - AVAILABLE AUTOPSIES WERE NEGATIVE - (1 BRAIN CANCER) NEVER CLEANED REACTORS.

MONSANTO CKL. 22-25 DEATHS - AT LEAST 1 SLIDE REVIC-ED AND NEGATIVE

PANASOTE - 4 CIRRHOSIS, NO AUTOPSY - ALL ALCOHOLICS +1 LUNG TUMOR.

CONOCO - SHORT HISTORY + PULLMARY SARCOIDOSIS,

ETHYL - SHORT HISTORY + PULLMARY SARCOIDOSIS, 2 SLIDES NEGATIVE
1 CIRRHOSIS, 1 BRAIN TUMOR)(NO SLIDES FOR EITHER)
+ KIDNEY TUMOR)

PRIOR 7-1/2 YRS, DOW ON VC LAKE CHAS - 1 BRAIN TUMOR
OK C+Y NO DEATHS
A BORDEN 10 DEATHS - 1 BRAIN TUNOR, 1 HEART ATTACK, 6 AUTOM., 1 GUN, 1 ELECTROCUTED.

UNIROYAL - 4 CANCERS (SHORT EMPLOYMENT) - NOT LIVER
2 CIRRHOSIS, BOTH ALCOHOLICS (BOTH LONG TERM EMPLOYMENT)
(PRESENT EMPLOYEES ON SMA 12 - 10% FAILED 1 OR MORE, 1-ALL 4
1/2 OK ON RECHECK)

GVT. AMER. - 1 CIRRHOSIS - ALCOHOLIC + 1 LIVER SURGICAL SHUNT
SAID NOT TO BE ANGIO RELATED.

LIKVI - NOW HAVE 25% TO RETAKE SMA 12 (5% OFFICE WORKERS)
3 DEATHS - 1 CIRRHOSIS (NON-DRINKER) + 1 HEART ATTACK.
MALE LUNG CANCER (CLIG)

GENERAL TIRE - 17 DEATHS. 2 CANCER (STOMACH - MALE 3 YRS.)
(BREAST, FEMALE) - 2 LIVING CIRRHOSIS

ROBINTECH - 2 DEATHS - 1 HEART ATTACK, 1 HODGKINS

DIAMOND - CHECKED RECORDS:

9 DEATHS: 1 CANCER AT RES. CENTER (EXPOSED TO VC)
(OF ESOPHAGUS)

0 LIVER PROBLEMS

3 AUTOPSIES - NO LIVER INVOLVEMENT (NO REVIEW OF SLIDES)

1 ASPHYXIATION IN PVC TANK

709 PEOPLE EXAMINED, 47 ABNORMAL BLOOD TEST -- 0 RELATED TO LIVER
RETESTING TO BE DONE - 3 POSSIBLE AOL'S.

## CASE HISTORIES

4033

GOODRICH -- LOUISVILLE

(k)-09 - b 11/8/31 (LIVING)

DIAGNOSED JANUARY '74 BLOOD TEST
RETESTED
PHASE II

MARCH BIOPSY

CONSISTENTLY EXPOSED TO VC IN BUILDING WHILE ON OTHER PRODUCTS EX_ CEPT HYCAR

WORK HISTORY:

(BLDG. EXPOSURE) VC RECOVERY

(BLDG. EXPOSURE)

ADDITIONAL EXPOSURE TO AN
STYRENE
BUTADIENE
ACRYLATE

| | |
|---|---|
| CHEMICAL HELPER (CLEANING) | 2-1/2 YRS. |
| RECOVERY OPERATOR | 4-1/2 YRS. |
| LATEX (MOST RECENT DUTY) | 1-1/2 YRS. |
| ABSON OPERATOR 2ND CLASS | 1-1/2 YRS. |
| HYCAR 5 RELIEF OPERATOR | 2-1/2 YRS. |

APPARENTLY NOT 1st CLASS CAPABILITY

PERSONAL

HEAVY DRINKER

(A) (CONT'D.)

EXPOSURE

| WORK HISTORY | VC DIRECT | VC INDIR. | OTHER |
|---|---|---|---|
| 9/9/54 HIRED | SAME BUILDING | | |
| 1/12/58 HELPER AND RECOVERY | 3-1/2 YRS. | | |
| LAYOFF 6 MONTHS | -- | -- | -- |
| '58 HYCAR | | | 2 MONTHS |
| 8/58 - PRES. LATEX | | | |
| ABSON OPERATOR 2ND CLASS | | | AN B S ACRYLATES |
| '58-'64 PVC | 6 YRS | | |
| ABSON | | 2 YRS. | |
| PVC | 8 YRS. | | |
| | 17-1/2 YRS | 2 YRS. | |
| OFF WORK ON 3/1/74 | | | |
| DIAGNOSIS | 17-1/2 YRS | 2 YRS. | |

MILDLY ELEVATED BILIRUBIN & PHOSPHOSTATES - NOV. '73

LIVER SCAN AND ANGIOGRAM = 4 CC DEFECT '73

(NO $VCL_2$ EXPOSURE)

(LOST ALL HAIR DURING TREATMENT)

FEBRUARY '74 SURGICAL BIOPSY FOUND ANGIO WITH EXTENSIVE FIBROSIS.

## LOUISVILLE CASE (B) - 06 LIVING

BORN: 11/23/28

START WK. 1/17/62

| WK. HST. | VC DIRECT | VC INDIRECT | OTHER |
|---|---|---|---|
| HELPER | 3-1/2 YRS. | | |
| LATEX | 2 | | |
| 2ND CLASS & RECOVERY | | | |
| CHARGE OP. | | | |
| RECOV. " | | | |
| ETC. TO PRES. | 7 APP. | | |
| | 12 APP. | | |

BLD. EXP. TO AcN, BUT, STY

(2 MOS. TO VC/$_2$ PERHAPS)

2/74 MILD ELV. LDH

LIVER SCAN = POS. DEFECT

SURG. BIOPSY FOUND ANGIO

DIAGNOSIS - BLOOD TEST OUT SLIGHTLY JAN.

- ANGIO BY BIOPSIS MAR. '74

PERSONAL: RECOTNIZED AS NONDRINKER

BACK AT WORK AWAY FROM VC

# LOUISVILLE CASE (C) - 05 DECEASED

| | | | |
|---|---|---|---|
| BORN: | 1/25/12 | | |
| START WK. | 6/19/44 | | |
| WK. HST. | VC DIRECT | VC INDIRECT | OTHER |
| HELPER - 6 MOS. & OP. 2ND CL. (INCL. VC/$_2$ MVC SYNTHESIS OP. 1ST CLASS | 10 YRS 2 YRS | | (NO EXP. TO AN BUT &TY) |
| PVC PKG'G | 1 YR (MINIMAL) | | |
| MVC SYN | (2 MOS.) | | |
| PVC PKG'G | 7-1/2 YRS | | |
| TOTAL | 21+ YRS. | | |
| DEATH | 4/9/64 | | |

DIAGNOSIS - LISTED CARDIAC TAMPONADE

\- 2ND LINE = ANGIO

PERSONAL - NOT KNOWN

NOT A (KNOWN) ALCOHOLIC

## LOUISVILLE CASE (D) - 04 DECEASED

BORN: - ? (1924)

START WK. - 10/24/49

| WK. HIST. | VC DIRECT | VC INDIRECT | OTHER |
|---|---|---|---|
| TO 7/6/52 | | | 3 YR.? |
| HELPER | (6 MOS.) | | + VC/2 |
| (12/52 - JUNE 55 | | | |
| (VC POLY OP. | | | |
| 2ND CL. | 2-1/2 YRS. | | NO VC/2 |
| 1ST CL. | | | |
| TO 8/67 | | | |
| POLY OPER | | | |
| 1ST CL. | 12 YRS. | | + VC/2 |
| TOTAL | 15 YRS. | | |

MILD ELEV

(DIED (4 MOS.) 1/68

KPHOS

& LDH

(DIAGNOSIS - CANCER OF LIVER

LET COUNT

( SLIDE REVIEWED 1/74 - ANGIO

W) 33 M

R SCAN SHOWED

(PERSONAL - ?

RGE DEFECT

( - NOT A KNOWN ALCOHOLIC

ARGED SPLEEN

S MORTEM:

GIO SPREAD

IAPHRAM

DOMINAL WALL

# LOUISVILLE CASE (E) - 01

| | | | |
|---|---|---|---|
| BORN: | - 10/17/23 | | |
| START WORK: | - 12/48 | | |
| WORK HIST. | - VC DIRECT | VC INDIRECT | OTHER |
| HELPER | 20 MOS. | | + VC/2 |
| OP. 2ND CL. | - | | |
| 1ST CL. | 15 YRS. | | + VC/2 |
| TO 5/65 | | | |
| SICK (5 MOS) | - | | |
| FOUND LIVER DAMAGE | | | |
| RETURN WORK 10/65 | | | MINIMAL |
| COMPOUNDING TO 10/70 | | | 5 YRS. |
| NO SICKNESS | | | |
| STOPPED 10/70 | - | | |
| | 17 YRS. | | |

5

V. SGOT

G FOUND VARICES

0 SURG. BIOPSY

IC HEPATITIS

7C NEED BIOPSY

ATITIS &

RI SIS

7C OPEN BIOPSY

CHT HEPATITIS

T MORTEM =

IO

(DIED 3/3/73

(DIAGNOSIS (ANGIO 1971?)

(PERSONAL NOT A KNOWN ALCOHOLIC

LOUISVILLE CASE (F) - 03

BIRTH: 5/25/15

START WORK: 11/28/45

| WORK HIST. | VC DIRECT | INDIRECT | OTHER |
|---|---|---|---|
| HELPER | (7 MOS) | | + VC/2 |
| OP.1ST CLASS | 9-1/2 YRS. | | + VC/2 |
| PKG'G | 1/2 YR. (MINOR EXP.) | | |
| 6/56 - 7/33 | | | |
| LATEX PVC | 17 | | XVC/2 |
| 1ST CL. OP. | _____ | | SAME |
| TOTAL | 28 YRS | | AN |
| | | | S |
| SICK 7 OR 8/73 | | | B |
| DIAG. ANGIO 12/73 | | | +ACRYLATES |
| DIED | 12/19/73 | | |

DIAGNOSIS - DIRECT ANGIO

PERSONAL HIST.- NOT A KNOWN ALCOHOLIC

/73 MARKED ELEV. ALK. PHOS, MILD BILIRUBIN & EGST

LIVER SCAN - DIFUSE DECEASE ?

& NEEDLE BIOPSY - FIBROSIS

& SURGICAL " - NO CANCER

POST MORTEM - ANGIO SPREAD TO DUODIDNO

LOUISVILLE CASE (G) - 02

BIRTH: 8/19/33

START WORK: 11/15/55

| WORK HIST. | VC DIRECT | INDIRECT | OTHER |
|---|---|---|---|
| HELPER | (9 MOS) | | XVC/2 |
| | | | +AN |
| | | | B |
| | | | S |
| | | | ACRYL |
| COMP.HLPR | (2 MOS) | | |
| HELPER HYCAR | | | 2 YRS. |
| LATE 58 | | | |
| CH. HLPR | (3 MOS) | | +VC/2 |
| EARLY 59-EARLY 63 | | | |
| CH.HLPR | 4 YRS. | | + ACRYLATE |
| CH.OP.2ND CL | (14 MOS) | | " |
| EARLY '64 OP.1ST 2ND | (6 MOS) | | + VC/2 |
| LATE '64 | | | |
| TO 5/68 OP.1ST | 3-1/2 YRS | | + ACRYLATE |
| SHIFT FR | 2 YRS. | | + VC/2 |
| OFF ILLNESS 5/1/70 | | | |
| TOTAL | 12 YEARS | | |

DIED 9/27/71

DIAGNOSIS CERTIFICATE (ANGIO?)
NO POST MORTEM

PERSONAL PRESSURE OK - NOT A KNOWN ALCOHOLIC

5/70 MILD ELEVATED ALL. 4 TESTS

LIVER SCAN = LARGE DEFECT ESOPHOGEAL VARICES

OPEN LIVER BIOPSY = ANGIO

GOODYEAR NIAGARA (H) - 08

BIRTH: - 5/6/20

HIRE - 10/7/46

DEATH - 8/29/61

AGE - 41

SERVICE - 15

WORK HIST.

PRE GOODYR - ODD JOBS - PA (SOME MINING?)

(VCM - ACETYLENE + HCl - 14 YRS.)

( CHEM. OPERATOR )

PVC OPER. 1 YR. )

CUMULATIVE TOTALS

15 YRS

MPLE CONTROL

BB ERS "SMELL

L E TIME"

FRIGERATED

TS DE STG.

SSELS

RES. VESSELS

---

PERSONAL ONE OF BEST OPERATORS IN PLANT

MODERATE DRINK - NO ABSENTEEISM

---

EXP. NO $VC/_2$

SMELL MALLEATES

---

DIAGNOSIS - 1/29/51 HEART ATTACK (BAD)

BACK IN 5/51 TO LIGHT DUTY 3 MOS

LAST DAY 4/2/61 TO HOSP. - GI HEMM'G.
- SURGERY

CERTIF. HEMM'G FROM ESOPHOGUS VARICES

(ANGIO) LIVER

AUTOPSY REPT. - SEVERE ARTERY PROB.

- SWELLED

_ ATE MEALS ON THE JOB

NIAGARA (I) - 10

BIRTH: 8/16/13

HIRE: 6/12/51

DEATH: 9/11/68

AGE: 55 YRS.

SERVICE: 17 YRS.

WORK HISTORY

| | |
|---|---|
| BAGGING & REACTOR CHG. | (7 MOS.) |
| VCM | (5 MOS) |
| PVC (GENL. OPERATING) | 16 YRS. |

DIAGNOSIS

D. CERTIF. - CIRRHOSIS OF LIVER

EARLY '74 SLIDE REEXAMINED & REDIAGNOSED TO ANGIO

LAST DAY WORKED - 4/5/68 (HAD "LOOKED LIKE HELL FOR 6 WKS")

BAD ALCOHOLIC -'52 DISCIPLINED & SEVERAL MORE TIMES

BUT GOOD OPERATOR

BIRTH: - 5/27/09

HIRE: - 10/14/46

DIED: - 3/16/70

AGE: - 60 YRS.

SERVICE - 23-1/2 YRS.

WORK HISTORY

STARTUP - ALL AREAS 2 YRS.

IME ON THE( SUPERV. IN VCM & PVC

R - LUNCH IN OPE. AREAS 21-1/2 YRS.

OFFICE

PRIOR 41 - 46 DU PONT CHEM. WARFARE PLANT 5 YRS.

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DIAGNOSIS - CERT. BLEEDING FROM HEPATOMA CIRRHOSIS

- REDIAGNOSED AS ANGIO BY REEXAM. OF SLIDES IN '74
- AT DEATH WAS REALLY BLOATED

---

PERSONAL - NEVER MISSED WORK

- MOD. BUT STEADY DRINK.
- OBESE
- 5 OR 6 YRS. PRIOR TO DEATH HAD DIABETIS
- 2 - 3 MOS. LAST DAY WORK. TO DEATH.

FIRESTONE - POTTSTOWN-(K) -12

4089

BIRTH: 11/17/18

HIRE: 5/46

DIED: 5/5/69

AGE 50

SERVICE: 13

| WORK HISTORY | VC | OTHER |
|---|---|---|
| TIRE PLANT 5/46 - 9/49 | | 3 YR. |
| GENERAL | | |
| PVC - SERV & UTIL '49 | (1 MO.) LO | SOME $VC/_2$ |
| EMULSION | | |
| BAGGER PVC | (14 MOS)LO | PHASED OUT $VC/_2$ |
| TO SUSPEN.PVC | | |
| DRYER OPER. | (14-MOS) LOW EXP. | |
| CENTRIFUGE | (8 MOS) PROB.LOW EXP. | |
| 1952 RELIEF OPER. | | |
| PUMP OUT MAN SLURRY | (8 MOS) HI? | + $VA_c$ |
| EXP.TO BUT., STRIPPER OP. | 3-1/3 YRS. MOD-HI | |
| cN,VPYRIDINE REACTOR OPER. | 9-1/4 YRS. HI AT TIMES | |
| INCL.SUSP,PVC CHGR, | | |
| DISP. RESIN CHGR. | | |
| STARTED FLUSHING BET.BATCHES | | |

K CONT.

1966 BUMPED BACK

TO SERV. UTIL. 3 YRS.

TO RETAIN DAY SHIFT

ROTATING ASSIGNMENTS, PROB.

INCL. SOME REACTOR CHG.

16 YRS. EXPOSURE TO PVC.

SICK SUSPENSE 2/19/69

DIED - READING HOSP. MAY

DIAGNOSIS

CERTIF: HEPATOMA

PATHOLOGIST ASKED 2 OTHER OPINIONS

= NO CHANGE

REDIAGNOSED FROM SLIDE IN MARCH '74 AS ANGIO.

PERSONAL

"CASUAL" WORK APPROACH - GOOD ATTENDANCE

BASIC 7 DAY WK - LOT OF OT ACCEPTED.

DESCRIBED AS "STEADY" TO "HEAVY" DRINKER BUT NOT AN ALCOHOL

ATE ON-THE-JOB FREQUENTLY.

4062

CARBIDE - SO CHSTN

CASE (L) - 07 DECEASED

BORN: 5/3/22

HIRED: 1944

DIED: 3/23/68

AGE: 46 YRS.

WORK HISTORY

| | | | |
|---|---|---|---|
| HIRED IN LOWES | CLEANING | ? YRS. | IND. HIGH EXP. |
| UNCERTAIN THEN SOME EXP. TO VCM | | | TO VC MOST OF |
| PVC | OPERATOR | 18 YRS. | TIME 250 TWA EST. |

PERSONAL - GOOD WORKER

- LITTLE DISPENSARY, LITTLE ABSENTEE
- NOT A KNOWN ALCOHOLIC

DIAGNOSIS 5/66 TROUBLE ?

1967 GALL BLADDER - REMOVED

& FOUND MASS IN LIVER (HEPATOMA)

11/67 T & P, 12/67 OPERATED - LIV. CANCER

SPREAD & CLOSED UP

POST MORTEM: ANGIO

4953

BORN: 12/1/21

HIRED: 8/ 19/44

AGE : 53 AT DIAGNOSIS

WORK HISTORY:

| | | |
|---|---|---|
| SOLVENT OPERATOR | 13 YRS. | MID-LOW EXPOS. |
| DISPERSION UNIT OPER. | 3 YRS. | HI EXPOS. |
| SOLVENT UTIL. FITTER | 9 YRS. | MOD. EXPOS. |
| SPECIALITY RESIN OP. | 4 YRS. | LOW EXP. |
| OCCAS. CLEANING | | |
| | 30 YRS. | NO VC/$_2$ |
| | | SOME AcN |
| | | BUT. |
| | | STY. |
| | | VAC. |

FE 4/73
ET. W/
I ETES,
YPERTENSION
U ULCER

PERSONAL - NOT A KNOWN ALCOHOLIC
- AVOIDED MED. EXAMS.

DIAGNOSIS - PICK UP IN 2/74 SURVEILANCE
ALL TESTS BADLY OUT
- LIVER SCAN SHOWED TUMOR
- SURG. BIOPSY = ADENO CARCINOMA
3 or 4/74 - SLIDE EXAM. BY (NIOSH) = PROBABLE ANGIO
- STILL OUT

| CASE NO. | COMPANY | PLANT | HRS. EXPOSURE VC INITIAL TOTAL | TO DIAGNOSIS |
|---|---|---|---|---|
| 01 | GOODRICH | LOUISVILLE | 17 HI<br>.5 LO | 22 |
| 02 | GOODRICH | LOUISVILLE | 12-1/2 HI | 14-1/ |
| 03 | GOODRICH | LOUISVILLE | 28 HI | 28 |
| 04 | GOODRICH | LOUISVILLE | 15 HI | 15 |

| OTHER EXPOSURE | PRIMARY OCCUPATION | REACTOR CLEANING | DRINKING HISTORY |
|---|---|---|---|
| $VCl_2$ - 17YRS. | PVC OPERATOR 15 YRS. | 2 YRS | ? |
| $VCl_2$ - 12y<br>[illegible]S - 2<br>A - 9 | PVC OPERATOR 7 YRS.<br>HELPER 5 YRS. | 5 YRS. | ? |
| $VCl_2$ - 10 MIN.<br>A[illegible]S - 17<br>A[illegible] - 17 | PVC OPER. | MINIMAL 7 MOS. | ? |
| $VCl_2$ - 12-1/2 | PVC OPER. 14-1/2 | 6 MOS. MINIMAL | ? |

4057

| CASE NO. | COMPANY | LOCATION | VC EXPOSURE TOTAL | TO DIAGNOS |
|---|---|---|---|---|
| 05 | GOODRICH | LOUISVILLE | 20 YRS. 12 HI & LO | 20 |
| 06 | GOODRICH | LOUISVILLE | 12 HI | 12 |
| 07 | CARBIDE | SO. CHARLSTON | 18 HI ? | 23 |
| 08 | GOODYEAR | NIAGARA | 15 HI | 15 |
| 09 | GOODRICH | LOUISVILLE | 17-1/2 HI 2 MOD. | 19-1 |

| OTHER EXPOSURE | | PRIM. OCCUP. | REACTOR CLEANING | DRINKING HISTORY |
|---|---|---|---|---|
| CL2 (6MOS.) AC ) 10 | | OP. PVC -10<br>VCM -<br>PKG'S. - 8 | 6 MOS. | ? |
| CL2 (2MOS.) ) AC ) 12 BC ) | | HELPER 3-1/2<br>PVC OP. 9 | 3-1/2 YRS. | NON-DRINKER |
| | | PVC OP.<br>(ATE IN CONTROL RM.) | MIN.? | ? |
| EM T. | * | VCM OP. 14<br>PVC OP. 1 | 0 | MODERATE |
| BS ) ) 19-1/2 A ) | | HELPER 3-1/2<br>PVC OP. 16 | 3-1/2 | HEAVY |

| AGE AT DEATH OR DIAGNOSIS | OTHER HEALTH PROBS. | ORIGINAL DIAGNOSIS | DEATH CERTIFICATE |
|---|---|---|---|
| 52 | HEPATITIS | HEPATITIS | ANGIO |
| 5 DX | ----- | SUSP. LIVER CANCER ANGIO | X |
| 46 | GALL BLADDER | HEPATOMA | ANGIO |
| 41 | HEART ATTACK AGE 31 | ANGIO | ANGIO |
| 43 | FIBROSIS | ANGIO | X |

4030

| CASE NO. | CO. | LOC. | VC EXPOSURE TOTAL | VC EXPOSURE TO DIAGNOSIS |
|---|---|---|---|---|
| | GOODYEAR | NIAGARA | 17 HI | 17 |
| | GOODYEAR | NIAGARA | 23-1/2 HI | 23-1/2 |
| | FIRESTONE | POTTSTOWN | 16 YRS. (10 HI) | 20 |
| | CARBIDE | SO. CHSTN. | 12 HI-MOD + 17 MOD-LO | 30 |

| OTHER EXPOSURE | PRIME OCCUPATION | REACTOR CLEANING | DRINKING HISTORY |
|---|---|---|---|
| DEM<br>MINIMAL | PVC OP. 16 | 1 YR. | HEAVY LONG TERM<br>ALCOHOLIC |
| DEM<br>MINIMAL | PVC-VCM SUPV"R.<br>(ATE IN OFFICE) | MIN.<br>2 YR. DURING | MODERATE |
| MIN. $VCL_2$<br>VAC<br>MIN. STY, BUT.<br>" VPYRIDINE | PVC REACTOR<br>CHARGER | MIN. | STEADY TO<br>HEAVY |
| ABS<br>VAC. | PVC OPERATOR<br>(ATE IN CONTROL<br>ROOM) | PROBABLE<br>MIN. | ? |

| AGE AT DIAGNOSIS OR DEATH | OTHER HEALTH PROBS. | ORIGINAL DIAGNOSIS | DEATH CERTIFICATE |
|---|---|---|---|
| 55 | CIRRHOSIS | SAME | SAME |
| 60 | DIABETIS<br>CIRRHOSIS<br>FAT | HEPATOMA<br>CIRRHOSIS | SAME |
| 50 | ----- | HEPATOMA<br>(3 OPINIONS) | SAME |
| 53 | DIABETIS<br>HYPERTENSION<br>DUO ULCER | ADENO<br>CARCMONA OF<br>LIVER<br>ANGIO | X |

## CHARACTERIZATION FROM (CASE HISTORIES - 13)

1. EXPOSURE 12 - 30 YEARS BEFORE DIAGNOSIS.

2. HIGH EXPOSURE =

   10 - 28 YEARS BEFORE DIAGNOSIS

3. ALL WERE PRIMARILY EMPLOYED IN VC OPERATIONS:

   12 IN PVC

   1 IN VCM

   (NO MAINT., LAB, OFFICE)

CONCLUSIONS:

1. THE SINGLE COMMON FACTOR IN THE OBSERVED 13 CASES OF ANGIOSARCOMA APPEARS TO BE - LONG TERM, CONTINUOUS WORKING EXPOSURE TO HIGH LEVEL (FREQUENTLY ABOVE ODOR THRESHOLD) VC ENVIRONMENT.

2. NONE OF 13 CASES WERE REPORTED TO HAVE AOL.

3. NO AGENT OTHER THAN VCM WAS FOUND TO BE CONSISTENTLY RELATED TO THE 13 CASES.

4. FOUR OUT OF 10 FATAL ANGIOSARCOMA CASES WERE DETECTED ONLY UPON RETROSPECTIVE EXAMINATION OF EXISTING SLIDES.

5. MAINTENANCE PERSONNEL WHO COULD HAVE BEEN EXPOSED TO HIGH "EXCURSIONS" WERE NOT FOUND AMONG THE 13 CASES.

- MAR - APR - MAY - APPLICANT ACCEPTANCES WERE 33/57
- EMPLOYEE SURVEY LOUISVILLE VS. AVON LAKE INDICATED IMPRESSION THAT INTENSITY OF VC EXPOSURE WAS SIGNIFICANTLY HIGHER AT LOUISVILLE.
- OTHERWISE NO SIGNIFICANT PROCESS OR PROCEDURAL DISTINCTIONS ARE SEEN AT LOUISVILLE

TWA - PPM - ARE MONITORING*

4365

| | CASES ANGIO | NO. REACTORS AS INDICATOR OF MECHANICAL SOURCES OV VC IN ENVIRONMENT | | | |
|---|---|---|---|---|---|
| | | 1954 | 1964 | | 1974 |
| LOUISVILLE | 7 | 125 | 125 | 10* | 125 |
| PEDRICKTOWN, N.J. | - | - | - | 7* | 18 |
| NIAGARA | | 11 | 11 | | ? |
| AVON LAKE | | 50 | 100 | 10* | 125 |
| HENRY, ILL | | - | 32 | 8* | 36 |
| LONG BEACH | | - | 8 | 12* | 24 |
| NIAGARA | 3 | 22 | 29 | | 31 |
| PLAQUEMINE | | - | - | | 10 |
| POTTSTOWN | 1 | 30 | 53 | | 53 |
| PERRYVILLE | | - | - | | 18 |
| SO. CHARLESTN | 2 | 10 | 16 | | 22 |
| TEXAS CITY | | 12 | 17 | | 31 |
| ROBIN TECH PAINESVILLE OHIO | | - | - | | 24 |
| DEER PARK, TEX | | 12? | 48? | | 52 |
| DEL. CTY, DEL | | - | - | | 26 |

TVA - PPM - ARE MONITORING



| | REACTORS | | |
|---|---|---|---|
| | 1954 | 1964 | 1974 |
| PACE, FLA. | 10 | 10 | 12 |
| CALVERT CITY, KY. | 18 | 18 | 19 |
| SPRINGFIELD | 17 | 17 | 9 |
| PASSAIC, N.J. | - | 20 | 20 |
| PT, PLEASANT, W.VA. | - | - | 21 |
| ABERDEEN, MISS. | - | 20 | 62 |
| OKL. CTY. | - | - | 4 |
| BATON ROUGE | - | - | 4-5* 10 |
| PAINESVILLE, OH. | (27) | 27 | 39 |
| FITCHBG,MA. | - | 6 | 15 |
| ASSONIT, MA. | - | - | 60 |
| ASHTABULA, O | 10 | 18 | 18 |

## ESTIMATED LEVELS OF EARLY VC EXPOSURE

| YIELDS: | EARLY | NOW |
|---|---|---|
| PVC/VCM | LOW 90'S | HIGH 90'S |
| % | | |

INDICATES TREND TOWARD LOWER LOSSES OF VCM (TO ENVIRONMENT)

IMPRESSIONS FROM EMPLOYEES "SMELL" RESPONSES

GOODRICH ESTIMATED AT 500 PPM EARLY LEVELS

EX LOS. INSTANTANEOUS READINGS BY MONSANTO WHILE OPENING MANHOLE WERE AS HIG

TESTING AS 30 - 40,000 PPM

IMPRESSIONS FROM VERBAL RESPONSES OF LONG TERM EMPLOYEES:

(GOODYEAR SURVEY) RESPONSE TO "SMELL" QUESTIONS

CALC. TWAS'S

| OLD ('46) | NEW ('57) |
|---|---|
| APP. 500 PPM | 150 PPM |

(ASSUMED "SMELL" THRESHOLD OF 400 - 500 PPM)

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EXPLOSION ALARM SYSTEMS USUALLY SET AT APPROX. 3600 - 25 M.
VERY OCCASIONALLY GO OFF DURING ACCIDENTS.

# EFFORTS TO CONTAIN VC AND REDUCE PERSONNEL EXPOSURE

--- PREVIOUS MAINTENANCE - VALVES, GASKETS, SEALS

--- IMPROVED INSTRUMENTS

GAS CHROMATOGRAPHS

INFRA RED

MONITOR DEVICES

--- IMPROVED VENTILATION

--- TIGHTENED PROCEDURES TO REDUCE EXPOSURE.
ALSO IMPROVED EQUIPMENT FOR SAME AND DESIGN.

--- EMPLOYEE EDUCATION.

--- AIR SUPPLIED RESPIRATORS + MORE USE OF

--- MONITORING PROGRAMS.

--- EARLY DETECTION MEDICAL PROCEDURES.

--- GENERAL HOUSEKEEPING PROCEDURES.

BASED UPON EXPERIENCE OF MEMBERS PRESENT, OCCASIONAL "EXCURSIONS" BEYOND ANY LIMITS ESTABLISHED CANNOT BE ELIMINATED WITH PRESENT TECHNOLOGY. WHEN EXCURSIONS OCCUR IN THE PRESENCE OF PERSONNEL, PROTECTIVE EQUIPMENT SHOULD BE UTILIZED.

## A POSSIBLE INTERPRETATION OF THE DATA

MINIMUM EXPOSURE WAS APPROXIMATELY 12 YEARS WITH 500 PPA, SO SOMETHING AROUND 6000 PPM YEARS IS ABOVE DESIRABLE LEVEL.

FORTY YEARS AT 150 PPM MIGHT GIVE COMPARABLE EXPERIENCE.

HAD 13 CASES IN APPROXIMATELY 65,000 MAN YEARS EXPOSURE OR 1 PER 5000 MAN YEARS.

4915

THIS IS HIGHER THAN "NATURAL" INCIDENCE OF ANGIOSARCOMA. EVEN IF OUR INDUSTRIAL EXPERIENCE WERE X4 OR X5, THIS WOULD BE LESS THAN ONE ADDITIONAL CASE PER 1000 MAN YEARS FOR CANCERS FROM ALL CAUSES. (+ .6%)

RISK IS NOT EXCESSIVE FROM AN OVERALL PUBLIC HEALTH POINT OF VIEW, AND REDUCTION TO PROPOSED SPI STANDARD WILL REDUCE THE RISK FURTHER.

CASE NO. ON SHEETS REFER TO

MOST 9/27.

CONFIRMED CASES OF LIVER ANGIOSARCOMA AMONG PVC WORKERS

| | CASE # | BIRTH DATE | 1st PVC WORK | DX ANGIO-SARCOMA | AGE AT DX | YRS 1st PVC TO DX | TOT YRS PVC | DATE OF DEATH |
|---|---|---|---|---|---|---|---|---|
| ates | 01 | 00-00-22 | 12-09-48 | 03-00-71 | 49 | 22 | 16 | 03-03-73 |
| ates | 02 | 00-00-34 | 11-15-55 | 05-00-70 | 36 | 14 | 13 | 09-28-71 |
| ates | 03 | 00-00-15 | 11-28-45 | 12-00-73 | 58 | 28 | 28 | 12-19-73 |
| ates | 04 | 00-00-24 | 07-06-52 | 08-00-67 | 43 | 15 | 15 | 01-07-68 |
| ates | 05 | 00-00-12 | 06-19-44 | 04-00-64 | 52 | 20 | 18 | 04-09-64 |
| ates | 06 | 00-00-29 | 01-17-62 | 02-00-74 | 45 | 12 | 12 | ALIVE |
| ates | 07 | 05-03-22 | 08-00-44 | 00-00-68 | 45 | 24 | 18 | 03-23-68 |
| ates | 08 | 05-06-20 | 10-07-46 | 08-00-61 | 41 | 15 | 15 | 08-29-61 |
| ates | 09 | 00-00-31 | 05-28-45 | 03-01-74 | 43 | 29 | 17 | ALIVE |
| ates | 10 | 08-16-13 | 06-00-51 | 05-00-68 | 55 | 17 | 17 | 05-10-68 |
| ates | 11 | 05-27-09 | 10-14-46 | 03-00-70 | 61 | 23 | 23 | 03-16-70 |
| ates | 12 | 11-17-18 | 09-13-49 | 05-00-69 | 50 | 20 | 15 | 05-02-69 |
| ates | 13 | 12-01-21 | 08-19-44 | 05-00-74 | 53 | 30 | 30 | ALIVE |
| y | 01 | 07-26-31 | 10-14-57 | 00-00-71 | 40 | 14 | 14 | 12-14-71 |
| y | 02 | 06-04-30 | 10-01-57 | 00-00-69 | 39 | 11 | 11 | 01-25-69 |
| tain | 01 | 00-00-01 | 00-00-46 | 12-00-72 | 71 | 26 | 20 | 12-00-72 |
| rew | 01 | 12-23-15 | 03-00-50 | 12-20-71 | 56 | 22 | 21 | 01-04-72 |
| ade | 01 | 00-00-27 | 00-00-51 | 00-00-70 | 43 | 19 | 18 | 00-00-70 |
| | 02 | 00-00-11 | 00-00-45 | 00-00-72 | 61 | 27 | 23 | 00-00-72 |

'0' indicates unknown date

RECEIVED
JUN 6 1974

Ex 20-K

Statement of Dr. Maurice N. Johnson, Director of Environmental Health
The B.F.Goodrich Company

Prepared For

Presentation At

Department of Labor Hearings On
Vinyl Chloride Occupational Exposure Standards
June 25, 1974

My name is Maurice N. Johnson. I received my Doctor of Medicine Degree from the University of Minnesota in 1947. I am certified by the American Board of Preventive Medicine in Occupational Medicine. I have been engaged in the full time practice of Occupational Medicine since 1954, and have been employed by The B.F.Goodrich Company for the past two years, and have been Director of Environmental Health for the past year.

We feel that the proposed standard for medical surveillance of employees exposed to vinyl chloride has three major deficiencies.

1. The proposed standard is directed to the detection of angiosarcoma of the liver or other liver disease, rather than to evaluating the general health of the employee. We do not feel that the examination should be directed exclusively toward liver pathology.

2. The proposed standard attempts to define which tests should be done to discover liver angiosarcoma, or the pathology which may precede it, even though it is generally recognized that none of the proposed tests has yet been demonstrated to be definitive for this purpose.

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3. The proposed standard leaves little room for the clinical judgment of the examining physician in evaluating the health status of the employee and recommending the advisability of his working in any given environment.

In the case of other carcinogens, for which standards were published by OSHA on January 29, 1974, a more general, and we believe better, approach was used. These standards provide for periodic physical examinations, but do not attempt to define a specific examination protocol. We note, for example, that in the case of bladder carcinogens, such as beta-Naphthylamine and 4-amino-bi-phenyl, where urinary cytology is a clearly indicated test, it was not specified in the standard. We feel that in the case of vinyl chloride, where the best test procedures are not yet established, it is even more important not to prematurely attempt to define the examination protocol.

Similarly, in the case of bis-chloro-methyl ether, a very potent carcinogen where the primary risk in man appears to be cancer of the lung, the standard calls for a periodic physical examination, but does not specify that it should be directed to any particular organ system.

In summary, we feel that at least until the effects of vinyl chloride exposure in man are better understood, and the best test procedures much better defined, it would be prudent to allow the examining physician to determine which tests are appropriate in each case; and on the basis of his over all evaluation of the employee's health, determine whether his work assignment should be changed.

We feel that the adoption of a medical surveillance standard similar to that already promulgated for the other carcinogens would best accomplish this.

Should the administrator feel that a different and specific medical surveillance standard is required, we urge the deletion of 1910.93 Q (o)(8) for the reasons mentioned above, and provision made for periodic updating of the examination protocol as new information or experience may dictate.

Ex 20

TESTIMONY OF

Dr. Rudolph H. Stehl
Senior Analytical Specialist
The Dow Chemical Co. U.S.A.
Midland, Michigan 48640

PREPARED FOR PRESENTATION OF

DEPARTMENT OF LABOR HEARINGS

ON

VINYL CHLORIDE

OCCUPATIONAL EXPOSURE STANDARD

June 25, 1974

This testimony is presented as a result of discussions among various members of the Society of Plastics Industry Task Force on Monitoring and Analytical Methods for the determination of vinyl chloride in the work environment. It does, we feel, reflect the current "state-of-the-art" with respect to analytical procedures, techniques, and instrumentation for the accurate measurement of vinyl chloride in a variety of work environments.

Procedures for the determination of vinyl chloride can generally be divided into two rather different groups:

1. Procedures applicable to the examination of plant or production atmospheres and reporting the results of that analysis immediately. Devices which collect a sample from a large area for a short time and report the results of that analysis immediately are termed area monitors.

2. Procedures which are applicable to the examination of the atmosphere directly surrounding work personnel. Devices

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which collect samples from this small area (usually in the worker's breathing zone) over a long period of time (e.g. 8 hours) and retain any collected material for subsequent analysis are termed personnel monitors.

In general, area monitoring provides information on what the concentration of suspected compounds is "right now" while personnel monitors provide information on what concentrations workers have encountered in the past.

Obviously, the time requirements for these two types of analyses are very different. The first, area monitoring, requires procedures capable of detecting vinyl chloride accurately, quickly, and reliably, since the area monitor generally is used to sample many locations (sequentially) and must operate with very little attention or maintenance. The second, personnel monitoring, requires that the method be able to accurately measure vinyl chloride in the presence of the many other gases and vapors with which the worker may come in contact

over the course of a day. Since the results are always ex post facto, speed of analysis is less important, but the accuracy and quantitative requirements are no less demanding than for area monitoring. Again, since examination of personnel monitors from many people may be required, and the analysis may be repeated at periodic intervals (annually, quarterly, etc.), the analytical procedure for the examination of personnel monitor samples must also not require high maintenance and must be very reprocible, since the most recent results are to be compared to previously analyzed samples (last month, last quarter, last year, etc.). Thus, the demands for accuracy, selectivity (the measurement of vinyl chloride with little interference from other compounds), sensitivity (to be able to detect concentrations as low as 1 part of vinyl chloride in a million parts of air), and reliability (to be able to make the measurement again and again and again without fail and without requiring extensive servicing or repair) are prime

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requirements for both area monitor and personnel monitor procedures. Additionally, area monitors have the demands to be able to do the analysis as quickly as possible so that any hazardous situations can be recognized and the situation corrected.

The methods and procedures which I will describe are procedures which have been used, either in the laboratory or in production environments or both for the determination of vinyl chloride in "air" (i.e. work environment). I will describe each procedure in some detail with particular attention to the differences between them as regards the points I mentioned earlier: selectivity, sensitivity, speed, and reliability. I will discuss them more or less in order of their applicability, although some particular situations will recommend one procedure over the others.

In order to be consistent with the goal of accurately

reporting concentrations of vinyl chloride throughout the work environment, each of the techniques discussed as "area monitoring" methods has the capability of analyzing "air" samples from a number of different locations sequentially and automatically.

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Analytical Methods

1. Gas-liquid chromatography (GLC)

This is a procedure which physically separates and quantitatively detects most individual components in mixtures. The principle upon which this method is based is that different compounds are absorbed into an organic silicone liquid to different degrees. If the silicone is deposited as a thin film on the surface of granular particles in a long tube and a carrier gas is forced to flow through the tube, when a sample mixture containing vinyl chloride and other compounds is introduced into one end, each compound, in the course of its travels through the packed column, will be absorbed by the stationary liquid and desorbed by the moving carrier gas in a unique manner. The result is that each compound will emerge from the tube at a unique time. If the temperature of the tube and the carrier gas flow rate in the tube are constant, each compound (including vinyl chloride) will emerge at its unique time reproducibly. Thus, when the emerging gas forms a part of

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the fuel source of a small flame, the individual compounds can be detected and quantitatively measured by their "effect" on the flame. If the main fuel source is hydrogen gas, organic compounds will be detected by virtue of formation of carbon ions in the flame and are observed electrically. These types of detectors are termed Flame Ionization Detectors (FID) and are widely used for the detection of organic compounds.

The resulting instrument, a gas chromatograph with flame ionization detector, is an extremely useful device for detecting and measuring vinyl chloride in work environments. There are many different models and styles available from many different manufacturers. They have been in use in laboratories and plants for many years and have a good record of reliability. They do require pure hydrogen gas and an uncontaminated source of air (as well as electricity) for their operation. The "open" flame used as the detector does not allow them to be used in areas where explosion hazards exist. Generally a separate room is advisable when they are used in production plants.

There are several outstanding advantages of gas chromatographic methods. Primary among them is the ability of this technique to selectively determine vinyl chloride in the presence of many other kinds of compounds. The ulitmate sensitivity of this method is also very good: about 1 ppm and perhaps as low as 1/10 ppm. This method is also applicable to both the analysis of "air" samples as an area monitor as well as being useful for the examination of personnel monitors.

The major disadvantage of this procedure is that somewhat longer times are required for the analysis; usually 5 to 15 minutes per analysis. This means, for area monitoring with 10 different areas or locations being sampled and the sample analyzed by one GLC-FID, each location is only monitored each 150 minutes. There is good evidence to suggest that the time required for the GLC-FID analysis could be reduced to about 5 minutes by means of additional valves but the long-term operation of these valves at these fast cycle times is not known and some maintenance problems can certainly be expected.

2. Infra-red Spectroscopy (IR):

Infra-red spectroscopy is another technique which has considerable applicability in the determination of vinyl chloride in "air" (i.e. work environments).

This procedure employs a device called an Infra-red spectrometer to irradiate the gaseous sample (contained in a sample cell) with radiation in the infra-red portion of the energy spectrum. Different molecules, by virtue of the chemical bonds comprising the molecule, will absorb energy at specific different wavelengths. For example, vinyl chloride shows rather strong absorption of energy at wavelengths of 6.15μ, 9.8μ, 10.9μ, and 13.9μ.

Since other common organic atmospheric contaminants have different arrangements of atoms, there is relatively little interference from most other compounds when the energy absorption is monitored at one of these wavelengths.

A major advantage associated with the use of IR as an

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area monitor derives from the fact that a relatively short time is required to make the energy absorption measurement. In general, only about two minutes is required for the measurement, although some additional time may be required to remove the previous sample and introduce the next one. With long pathlength cells, sensitivities of 2-5 ppm can be expected and lower concentrations are obtainable with some additional modification of the sampling procedure.

A major limitation of IR for area monitoring is associated with the fact that the air sample can vary considerably with respect to content of other components, primarily water vapor. Water vapor does show some absorption at 6.15μ and, although this could be compensated, results in a decrease in sensitivity. There are some procedures which have been used to reduce the amount of water vapor in the sample stream but they are still being tested in several laboratories and their long-term reliability is yet unproven.

A secondary effect of water vapor as well as some other compounds is to slowly form a deposit or "mist" on the transparent end-windows of the sample cell. This too reduces the sensitivity and causes the instrument to be unstable. Again, the demonstration of applicability of several of the water vapor "traps" would reduce the magnitude of the problems. At the present time, there are several manufacturers of IR monitoring equipment.

3. Combustion Conductivity

The technique called combustion conductivity has also been employed as an area monitor for vinyl chloride. This method is based on the fact that when vinyl chloride is heated in air at 1000°C (1800°F), almost all of the vinyl chloride is converted to carbon dioxide and hydrochloric acid (HCl). If the combustion products are bubbled into a "pure" water stream, the HCl may be detected by virtue of

the increase in electrical conductivity of the water (due to the hydrogen ions and chloride ions). This method is very rapid, only about 30 seconds being required to measure the conductivity.

It does not require a large amount of maintenance and is a relatively simple device to both install and maintain. The major disadvantage of this method is that there are many other compounds which would be detected as well as vinyl chloride. Particularly severe interference would be expected from such compounds as the various FREON® gases, common refrigerant gases. However, this device, when used to monitor plant atmospheres where interferences are known to be low, can provide a rapid indication of the concentration of vinyl chloride. The simplicity of the data collection lends this device to easy computerization to provide supervisory personnel with calculated time-weighted average exposures for different types of jobs within the area being monitored.

4. Total Flame Ionization Detectors (FID)

This method is similar to the previous combustion conductivity method in that the total sample is subjected to burning and the combustion products monitored (as Method 1, GLC-FID). However, the sample is not physically separated into constituent compounds. This procedure, like number 3, is relatively fast; about 2 minutes per sample. It too has a relatively simple data presentation and is easily amenable to a variety of computer generated report formats (calculated TWA, etc.).

The major disadvantage, like number 3 above, is that it too is a non-specific analyzer.

In general, any organic compound (i.e. containing carbon) will be detected and generally with a sensitivity equal to that

for vinyl chloride. Thus, any contamination of the area being monitored from automobile exhaust, hydrocarbon vapors, etc., will be detected as vinyl chloride. Some correction of the signal from these interferences is possible but generally at the expense of simplicity and reliability.

5. Gas Chromatography - Mass Spectrometry (GC-MS)

This analytical method is not generally applicable to the problem of area monitoring of vinyl chloride. However, it is probably the most specific method for the determination of vinyl chloride. It also amenable to a wide variety of types of samples and is capable of sensitivities well below 1 ppm. It is discussed briefly here since it appears to be useful as a REFERENCE METHOD. As such, it can be used to determine the concentration of vinyl chloride in a variety of different situations and the results compared to one or more of the above area monitoring methods.

The principle of this method is the same as number 1, GC-FID; physical separation of sample components in a packed tube. However, in this procedure the compounds emerging from the tube are detected with a device called a mass spectrometer. This instrument subjects the sample gas in a rather high vacuum to bombardment by a stream of electrons. These electrons cause the formation of ions of the sample gas. These ions are then separated according to their mass by a magnetic field. Since each compound produces ions which are peculiar to its own atomic and molecular structure, the resulting ions are extremely characteristic of each different compound. When this characteristic ion spectrum is combined with the specificity obtained from the gas chromatographic column, the result is that there are almost NO interferences in the determination of vinyl chloride.

A major limitation to the use of GC-MS for area monitoring is that it is a fairly complex instrument which requires a

trained analyst for operation. Also, the maintenance is greater than any of the previously mentioned methods. Finally, the instrument is expensive to buy and maintain ($50,000 minimum, $5-10,000/yr. maintenance).

6. Personnel Monitoring Techniques and Procedures

As mentioned earlier, personnel monitoring is extremely useful for the examination of the immediate environment around workers. The normal procedure consists of collecting a sample of "air" from the worker's breathing zone continuously as the employee goes about his normal tasks. If the collected sample is then analyzed, the result yields the total amount of vinyl chloride to which the worker was exposed. At this time, there are no continuously-indicating devices which can be worn to provide an immediate indication of vinyl chloride concentration. Since this sort of monitoring serves the very useful purpose of permitting an actual "encounter" record, the analysis must be as fast and accurate as possible.

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Since samples are collected over a long period of time (up to 8 hours), the collection device must retain essentially all vinyl chloride until the time of analysis and then permit essentially all the collected vinyl chloride to be removed for analysis. Additionally, the collection device must be sufficiently comfortable to wear so as to not interfere with the normal safe performance of each employee's job.

Components necessary for accurate personnel monitoring include:

a) sample collection system, comprised of an "air" pump, sample tube, and adsorbent to hold the collected vapors.

b) sample elution and analysis system consisting of equipment for removing vinyl chloride from the adsorbent and determining the amount.

The system components for collection should be components of well-tested reliability and performance. For example, silica

gel adsorbent must be used with caution, since high relative humidity will cause incomplete sorption of vinyl chloride, especially if high sampling flow rates are used. Activated carbon has shown extreme variability in its ability to adsorb vinyl chloride. Two types of carbon which appear to be successful are Pittsburgh PCB, 12/30 mesh and Westvaco WV-H, 8/30 mesh.

Elution of the vinyl chloride from the activated carbon for analysis can be achieved either by solvents or by heating. If solvents are used, carbon disulfide is the preferred eluting solvent. It, however, is extremely flammable and precautions must be taken to avoid exposure of fumes to open flames, sparks, and heat. Alternately, any vinyl chloride collected can be desorbed by heating the adsorbent tube to 430°C and flushing with 12 liters of dry nitrogen gas, collecting the gas in an appropriate bag. Both elution procedures appear to produce accurate, reproducible results. If the sample collection tubes

are not analyzed immediately, care must be taken to avoid additional contamination or loss of vinyl chloride. It is preferable to analyze the samples within several days of their collection. Obviously, all sampling and analytical instruments should be calibrated and tested before use and the initial results compared to duplicate samples taken for analysis by the reference method.

Sampling Frequency:

The number and frequency of samples required to insure a safe and healthful work environment requires judgement. Continuous area monitoring can be used as a processing aid to allow for early detection of leaks and losses so that equipment can be maintained. It can notify the employee of a contaminated area so that proper protective equipment can be worn to prevent exposure. With adequate continuous monitoring of the work area, less frequent personnel monitoring is needed to document employee exposure. If the continuous monitors

indicate that the work environment is in compliance with established standards, an annual personnel monitoring program should suffice. If continuous area monitors demonstrate that potentially hazardous areas exist, a quarterly personnel monitoring program by job classification should be done.

Summary and Recommendations

1. Reference analytical methods should be established in the permanent OSHA vinyl chloride standard.

2. Continuous area monitoring should be installed in those areas with potential employee exposure. Several different instruments and methods are acceptable, depending on each particular location and manufacturing situation. Whichever instrument or method is used, it should be checked no less than quarterly against the Reference Method using air samples as similar as practicable to those extant in the work environment.

3. Annual Personnel Monitoring should be done in those plants with continuous area monitors. Personnel monitoring

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should cover each job classification, with potential exposure under typical operating conditions. Quarterly personnel monitoring should be done, by job classificaitons and under typical operating conditions, in those plants without continuous area monitors.

4. Gas chromatography, or where it is available, gas chromatography-mass spectrometry should be established as the instrument in the Reference Method. Specific analytical procedures which have been successful are given in the attached documents, particularly Dow Method ML-AM 74-12.

5. All results should be recorded as the time-weighted average (TWA) for the period of actual sampling time.

Ex 20-0

Statement of Louis J. Molinini

Vice President, Gollob Analytical Service Corp., Berkeley Heights, New Jersey

Prepared for presentation at the Department of Labor hearings on vinyl chloride; Occupational Exposure Standard, June 25, 1974.

My name is Louis J. Molinini. I hold a BS degree in chemistry which I received in 1947 from St. Peter's College, Jersey City, N. J. I was employed as a chemist at the Air Reduction Research Laboratory, Murray Hill, N. J., from 1948 to 1963. During this period I was involved in all phases of chemical and instrumental analysis. The last five years at Air Reduction I was a Section Head responsible for the gas analytical facilities which included methods development, service analyses to research projects, trouble shooting during air separation plant startups and company quality surveillance. In 1963, I joined Dr. Fred Gollob in forming Gollob Analytical Service, Inc. I am a member of the American Chemical Society, American Council of Independent Laboratories and the Air Pollution Control Association. At present I am the Vice President and Chief Chemist of Gollob Analytical Service Corp.

Gollob Analytical Service Corp., a wholly owned subsidiary of Will Ross, Inc., functions autonomously as an independent analytical laboratory providing services to industry, the academic world, government agencies and the general public. Although G.A.S. specializes in the analysis of gases and liquids, it also provides analytical services in related areas.

In the last twelve years, one of the major areas of specialization has been the sampling and analysis of trace contaminants in air and water. G.A.S. has visited over 100 industrial plants, obtained samples, performed analyses and provided reports which were suitable for submission to E.P.A., N. J. Bureau of Air Pollution, OSHA, Department of Health and other governmental agencies.

During the last four months, since vinyl chloride monomer has been recognized as a health hazard, G.A.S. has been very active in the sampling and analysis of industrial atmospheres for vinyl chloride monomer. During this period, G.A.S. personnel have visited, sampled and determined the vinyl chloride monomer content in plant air from approximately 20 fabricators of PVC. At these locations, PVC products such as pipe, film, bottles, boots, records and electrical wire insulation were produced. Both pellets and compounding were used. In addition, G.A.S. has analyzed samples for 20 or more PVC fabricators and manufacturers. In order to insure that our analytical techniques are equal to the current best state of the art, G.A.S. has been in frequent communication with NIOSH, the technical arm of OSHA.

To be specific, during a plant monitoring, air samples are collected at breathing zone level by attaching a NIOSH approved charcoal tube to the employee's collar. A portable battery operated OSHA approved personal sampling pump is used to aspirate the air at 50 cc per minute for ten minutes through the trap. In addition, integrated gas samples are collected in special evacuated glass containers. All samples are then returned

to the G.A.S. laboratory and analyzed by Flame Ionization Gas Chromatography for vinyl chloride monomer content. The technique used is capable of detecting as little as .1 ppm volume/volume.

Our findings are that, in the fabrication plants surveyed, the vinyl chloride monomer content was less than 1 ppm except in the mixing and storage areas. However, we have witnessed this problem solved with adequate ventilation. G.A.S. has also reviewed the data supplied by SPI from 10 additional fabrication plants, and the results in all cases are consistent with our findings of less than 1 ppm vinyl chloride monomer in the fabrication areas.

Ex. 20-P
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STATEMENT OF

PAUL BEEBE JR., DEVELOPMENT MANAGER

FILMS AND FLOORING DIVISION

GOODYEAR TIRE AND RUBBER COMPANY

Prepared for presentation at the Department of Labor hearings on the proposed standard for Occupational Exposure to Vinyl Chloride to be held June 25, 1974.

TEXT OF TESTIMONY
BY
PAUL BEEBE, JR.
DEVELOPMENT MANAGER, FILMS AND FLOORING DIVISION
GOODYEAR TIRE AND RUBBER COMPANY

My name is Paul Beebe, Jr. I am employed by the Goodyear Tire & Rubber Co, Films & Flooring Division, as Development Manager, a job I have held for the past 11 years. Prior to that, I worked in the Division's Packaging Films Department for 15 years, first as a development engineer and later as Section Head. In total, I have had just over 26 years of continuous working experience for Goodyear in this Division.

Goodyear has five separate plants for processing polyvinyl chloride products for the Films & Flooring Division in the USA. There are no vinyl chloride monomer or polymer producing operations at any of these plants. I am speaking only of processing plants.

We have three major product lines. The largest of these product lines is Packaging Films, which are made in all five of our plants. Two plants, one in Akron, Ohio, and one in St. Marys, Ohio, produce films from a tetrahydrofuran solution of polyvinyl chloride cast on a continuous belt. The other three plants, one in Akron, Ohio, one in Calhoun, Georgia, and one in Merced, California, use a bubble extrusion process.

We also produce Plastic Films & Sheeting. This operation is in Akron, Ohio, and involves four calenders and the associated mixing equipment producing polyvinyl chloride films for a variety of applications including wall covering films, label films, ecological pit and pond liners, UL approved insulation facings, etc.

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The final product line, also made in Akron, Ohio, is Flooring. The basic equipment used is a calender and a set of laminating and annealing ovens.

Summarizing, we use a variety of processing equipment including solvent casting units, extruders, calenders, laminating ovens, mills, Henschel mixers, ribbon blenders, and intensive mixers. Most of the polyvinyl chloride resin we use comes from Goodyear's two resin producing plants at Niagara Falls, New York, and Plaquemine, Louisiana, but we have also used resin in quantity from other major manufacturers in the United States.

Prior to the publication of the Emergency Temporary Standard for Exposure to Vinyl Chloride in the April 5, 1974, Federal Register, we sampled our two Akron plants to determine VCM concentrations. These surveys showed we had no problem in either our Plant "C" operation, which is the plant producing solution cast films, or our Plant "B" operation which is where the extrusion, calendering, and flooring operations are located.

Shortly after the Emergency Standard was issued, the Corporate Industrial Hygiene Department issued detailed instructions regarding type of equipment required and procedures for taking the necessary samples. These instructions are included as Attachment I, and the test method used to evaluate the samples comprises Attachment II.

We have, since then, been monitoring personnel at various work stations at all five plants. The only personnel data indicating values other than "not detected" or less than 1 ppm have been from personnel who unload and sample resin rail cars

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and personnel involved in the operation of the Henschel mixers at Plant "B", Calhoun, and Merced.

The highest sample reading we have had from personnel unloading resin cars has been 2.5 ppm. Eight-hour time weighted averages are less than 1 ppm. Goodyear has put sampling valves on the side of many of our rail cars and is continuing to implement this procedure. This reduces personnel exposure to VCM during sampling.

It is important to note that all of the in-plant results were obtained without any physical or procedural changes to the plants or the equipment except at the "Henschel" areas. Accordingly, it is reasonable to conclude that the data, except at that area, is representative of the personnel exposure to VCM in the plants since they began operating. Except for the improvements being engineered in the "Henschel" areas, we see no reason to expect the conditions to change other than to improve as the VCM level of delivered resin is reduced.

We have made two changes in the three plants running Henschel mixers to mix compound for pellet production:

1. We have vented to the outside of the plant the exhaust air from the resin weigh system.
2. We have introduced purging air to the inside head space of the Henschel mixers. The purge air is vented from the room at Akron, Plant "B", and the data indicates "not detected" or less than 1 ppm. At Calhoun and Merced, the purge air is not vented from the room; and we have recorded sample data as high as 8.3 ppm.

A third change, started in March and now ready for installation at all three plants, is to provide for a 10 inch vacuum, vented to the outside on each Henschel mixer. This design change was engineered to completely eliminate the VCM contamination at these areas. It will be completed by mid-July. At that time, there should be no in-plant personnel work stations where exposures to VCM are 1 ppm or over.

Even under present conditions, 8-hour time weighted average exposures at Plant "B" and Calhoun for our Henschel operators are less than 1 ppm. At Merced, where the mixer is in a confined location, we have had one sample of 8.1 ppm and one of 1.6 ppm.

If you were to visit our factories, you would not be surprised that the work stations are essentially free of VCM. We have generally provided good exhaust conditions at all stations where fumes or dust would represent a potential comfort or health problem to personnel working at the station. Indicative of this is the fact that we had no citations regarding dust or ventilation resulting from an OSHA inspection of Akron, Plant "B" facility on October 11, 1973.

I think it is significant that even at the largest complex, Plant "B" in Akron, where we use approximately 35 million pounds of resin annually, there is no chance for any catastrophic release of vinyl chloride monomer at any personnel work station or elsewhere in the plant. The same is true for the other four processing plants.

The above data were obtained using regular lots of commercially available polyvinyl chloride resin. Even under these conditions, work place levels of more than 1 ppm of VCM are encountered only in the receiving and mixing areas of our plants, and it is obvious that appropriate engineering action can reduce VCM levels in the mixing locations to the "non-detectable" or less than 1 ppm level.

Because we have demonstrated that we can operate all in-plant work stations at the non-detectable or less than 1 ppm level, we feel that processing plants should be exempted from those provisions of the proposed standard relating to signs, labels, clothing, and medical examinations. We would agree that routine VCM testing should be conducted [redacted] and the results recorded. Abnormal results should indicate a need for corrective action, but not on an "emergency" basis as presently outlined. We believe routine OSHA surveillance would insure compliance.

Ex 20-Q

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STATEMENT OF ARTHUR A. SMITH
Vice President of Operations
Robintech Incorporated
Fort Worth, Texas

Prepared for Presentation at the Department of
Labor Hearing on Vinyl Chloride: Occupational Exposure Standard

June 25, 1974

---

I am Arthur A. Smith, presently Vice President of Operations for Robintech Incorporated, headquartered in Fort Worth, Texas.

Robintech is a producer of polyvinyl chloride resin with plant in Painesville, Ohio. A second plant is under construction at Freeport, Texas. Robintech is also a manufacturer of PVC pipe and fittings. We currently operate nine plants in eight states with the tenth plant under construction. We have two other plants on the drawing boards.

I left the teaching profession and began my industrial work career in the early 1950s, when I was employed by a PVC Resin Producer (Diamond Alkali), as a chemist in its quality control laboratory. This work assignment required daily analysis of vinyl chloride monomer and polyvinyl chloride resin. Due to the state of the art at that time, my activity required daily contact with liquefied vinyl chloride monomer.

As our product line expanded, I began working on polymer development in our polymerization pilot plant to develop and prove out recipes for new and/or improved resins.

At this point in time, I began doing some Technical Service work

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with customers in their processing or converting plants.

In the late 1950s, I changed assignments and began working solely in Technical Service and Sales, calling on all types of processors and convertors using polyvinyl chloride resin.

This involved working with customers on their equipment in search of solutions to specific problems in extrusion, calendering, and molding.

Since the early 1960s, I have been in the management of either sales or manufacturing (processing) of polyvinyl chloride resin.

In my present position, when we received word about the alleged tie between vinyl chloride monomer and angiosarcoma of the liver this year, we began monitoring our products for residual VCM, monitoring our PVC plant, and monitoring our pipe and fittings plants.

As the potential for processing plant involvement became a question, I became associated with the SPI committee and worked with the task force assigned to study the fabricator situation.

It would first be well to recognize there are hundreds of processing plants with multi-product lines within the same facility.

Many processing plants utilize only pelletizing compounds. Some use both resin and pelletized compound, while others use only specialized

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resins. The main difference between pelletized compound and resin is that the pelletized compound has additives incorporated and has been subjected to an extensive heat history.

There is still another category of processor who utilizes a powder blend compound which has also been subjected to heat history.

There are combinations of types of processing plants such as molding, calendering, extrusions, and coatings. There are also numerous combinations within these types of processes.

I have been working on the task force investigating and collecting data from the processors plants. We have collected data from numerous sources, even some from Europe.

Since no two plants are alike, we set out to have all our plants monitored and results obtained on the same methodology with same instruments and same technicians.

In addition to this, we have requested our insurance carrier to make the same survey with their Industrial Hygienist and both sets of this data are attached.

This data teaches us that our range is from no detectable level on the low side to ~~2045~~ 37.6 ppm; that level being present only directly above the intensive mixer. Personnel carbon tube sample for the same area shows 15.4 ppm vinyl

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chloride. This high level of ~~20.5~~ 37.6 ppm can readily be eliminated by venting the mixer through safe work procedures.

The mixing room areas range from zero ppm to a high of 20.5 ppm. In connection with this area of the plant operation, it is felt that if the area meets the current clean air portion of an existing standard - 1910.93, the employee will not be exposed to hazardous levels of vinyl chloride monomer.

Based on all our findings, we join in the view that processing plants should be excluded from the coverage of the proposed standard, since it has been demonstrated that there is no significant exposure for employees in areas other than in mixing operations, where readily attainable ventilation and work practice procedures will eliminate any possible danger.

Arthur A. Smith

AAS/if

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# PLANT SURVEY

All the values shown here are results of carbon tube (Sipin Pumps) at the locations noted.

| Robintech Incorporated Springfield, Kentucky | | Vinyl Chloride |
|---|---|---|
| 1. | Extruder Operator | 1.3 ppm |
| 2. | Operator at Cut-Off Saw | 1.4 ppm |
| 3. | Blending Operator (Transferring Material) | 0.3 ppm |
| 4. | Operator at Cut-Off Saw & Belling | 0.5 ppm |

| Robintech Incorporated Pace, Florida | | |
|---|---|---|
| 1. | Mixing Operator during Cycle (AM) | 24.6 ppm |
| 2. | Mixing Operator during Cycle (AM) | 15.4 ppm |
| 3. | Mixing Operator during Cycle (AM) | 18.6 ppm |
| 4. | Mixing Operator during Cycle (PM) | 17.2 ppm |
| 5. | Mixing Operator during Cycle (PM) | 32.2 ppm |
| 6. | Mixing Operator during Cycle (PM) | 18.6 ppm |
| 7A. | Extruder Operator | 0.4 ppm |
| 8A. | Extruder Operator | 1.0 ppm |
| 9A. | Extruder Operator | 5.6 ppm |
| 10A. | Extruder Operator | 4.6 ppm |

ROBINTECH
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Plant Survey
Page 2 - continued

Robintech Incorporated
Anderson, South Carolina

| | | Vinyl Chloride |
|---|---|---|
| 7B. | Main Office Building Office | <0.2 ppm |
| 8B. | Belling Machine Operator (3/4" Dual Line) (BT-100) | <0.2 ppm |
| 9B. | Belling Machine Operator (4" Dual Line) (A4/125/125) | <.0.2 ppm |
| 10B. | Operator Walking over Entire Plant | <0.2 ppm |
| 11. | Extruder Operator A4/125 | <0.2 ppm |
| 12. | Blender Room Operator Transferring Material, only | <0.2 ppm |

Some Industries (Robintech Subsidiary)
Rolla, Missouri

| | | |
|---|---|---|
| 13. | Extruder Operator | <0.2 ppm |
| 14. | Extruder Operator (Smoking during test) | 0.2 ppm |
| 15. | Blender Operator in Area of Screening | 7.5 ppm |
| 16. | Extruder Operator | <0.2 ppm |
| 17. | Blender Operator in the Screening Operation | 7.4 ppm |
| 18. | Mixing Operator during Mixing Cycle | 37.6 ppm * |
| *19. | Mixing Operator during Mixing Cycle | 19.2 ppm* |

* Recheck of No. 18

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Robintech Incorporated
Grinnell, Iowa

| | | Vinyl Chloride |
|---|---|---|
| 20. | Extruder Operator | <0.2 ppm |
| 21. | Extruder Operator | <0.2 ppm |
| 22. | Extruder Operator | <0.2 ppm |
| 23. | Mixing Operator during Transfer of Material (not mixing) | <0.2 ppm |
| 24. | No Sample - (battery down) | ppm |

Robintech Incorporated
Hillsboro, Texas

| | | |
|---|---|---|
| 24. | Extruder Operator | <0.2 ppm |
| 25. | Extruder Operator | <0.2 ppm |
| 26. | Injection Molding Machine Operator (Van Dorn Machine) | 0.6 ppm |
| 27. | Grooving Machine Operator (#2) | 1.0 ppm |
| 28. | Grooving Machine Operator (#4) | 2.0 ppm |
| 29. | Grooving Machine Operator (#3) | 1.4 ppm |
| 30. | Injection Molding Machine Operator (Lombard Machine) | 1.2 ppm |
| 31. | Injection Molding Machine Operator (Lombard Machine) | <0.2 ppm |
| 32. | Injection Molding Machine Operator | <0.2 ppm |

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| | | Vinyl Chloride |
|---|---|---|
| 33. | Injection Molding Machine Operator | <0.2 ppm |
| 34. | Injection Molding Machine Operator | <0.2 ppm |
| 35. | Grooving Machine Operator (#2) | <0.2 ppm |
| 36. | Injection Molding Machine Operator | <0.2 ppm |

Robintech Incorporated
Newman, California

| | | |
|---|---|---|
| 37. | Extruder Operator (Dual Line) | 0.2 ppm |
| 38. | Grinder Operator | <0.2 ppm |
| 39. | Belling Operator (3"pipe) | <0.2 ppm |
| 40. | Extruder Operator (Single Line) | 1.7 ppm |
| 41. | Quality Control Laboratory (Table) | <0.2 ppm |
| 42. | Mixing Room.Operator (Not mixing) | <0.2 ppm |
| 43. | Mixing Room Operator (Transferring Material) | <0.2 ppm |

Robintech Incorporated
Elsinore, California

| | | |
|---|---|---|
| 44. | Extruder Operator (Purging material) | <0.2 ppm |
| 45. | Extruder Operator (BT-100 Dual Line) | <0.2 ppm |
| 46. | Extruder Operator (Purging Machine) | <0.2 ppm |
| 47. | Mixing Room Operator (Not mixing-Transferring) | 1.1 |
| 48.] 49.] | Tubes Voided | -Broken- |

Robintech Incorporated
Vestal, New York

| | | Vinyl Chloride |
|---|---|---|
| 50. | Office (Main Office Building) | <0.2 ppm |
| 51. | Extruder Operator | <0.2 ppm |
| 52. | Grinding Operator | <0.2 ppm |
| 53. | Inside Water Drainline in Field (Process Drain Water) | 0.2 ppm |
| 54. | Laboratory Supervisor at Desk | 1.6 ppm |
| 55. | Cable Assembler at Work-2nd Floor | <0.2 ppm |
| 56. | Mixing Room in Application Laboratory | <0.2 ppm |

AAS/if

Continued - Elsinore

| | Vinyl Chloride |
|---|---|
| V. Plant Perimeter | _____ ppm |

Robintech Incorporated
Vestal, New York (18 ppm Total Hydrocarbon) (background)

| | |
|---|---|
| I. Main Office Building | -0- ppm |
| II. Rail Car | |
| A. Inside 3/4 Empty Compartment | 10 ppm |
| B. Inside Empty Compartment | 4 ppm |
| III. Warehouse Area | -0- ppm |
| IV. Grinding Machine Area | -0- ppm |
| V. Extrusion Line Area (downstream) | -0- ppm |
| VI. Process Water (cooling) Drain Line in Field | 2 ppm |
| VII. Perimeter of Plant Area | -0- ppm |

Robintech Incorporated
Springfield, Kentucky (12 ppm Total Hydrocarbon)

Hydrogen not pure, therefore, no reliable VCM readings obtained. Only total hydrocarbon readings were obtained and were in line with other plants.

Robintech Incorporated
Newman, California (11 ppm Total Hydrocarbon)
(background)

| | | Vinyl Chloride |
|---|---|---|
| I. | Inside Rail Car Port Opening | 35 ppm |
| II. | Truck Unloading Area (Including along Conveying Lines) | -0- ppm |
| III. | Silo Area during Filling & Unloading | -0- ppm |
| IV. | Compressor Room | -0- ppm |
| V. | Employee Lunchroom | -0- ppm |
| VI. | Tool Room | -0- ppm |
| VII. | Compound Storage & Transportation Bins (Two inches from Compound) | -0- ppm |
| VIII. | Quality Control Lab & Control Room | -0- ppm |
| IX. | Mixing Area (Next to Mixer) (During transfer of material) | -0- ppm |
| X. | Ceiling of Mixing Room (Approximately 10 inches from ceiling) | -0- ppm |
| XI. | Perimeter of Plant Area | -0- ppm |

Robintech Incorporated
Elsinore, California (18 ppm Total Hydrocarbon)
(background)

| | | |
|---|---|---|
| I. | Rail Car Inside car freshly opened port | 110 ppm |
| II. | Purging Extruder | -0- ppm |
| III. | Extruder Area (BT-100 Dual) (One inch from Extrudate) | 2 ppm |
| IV. | Quality Control Laboratory | -0- ppm |

Robintech Incorporated
Hillsboro, Texas (12 ppm Total Hydrocarbon) (background)

Vinyl Chloride

I. Rail Car Compound

A. Inside car freshly opened — 68 ppm

II. Mixing Room

A. No mixing (transferring material)
No detectable level — -0-

III. In area of Silo

No detectable level

IV. Extrusion Line

A. Over extruder Vent — 20 ppm

B. Area - No detectable level — -0-

V. Office Area - No detectable level — -0-

Unitech (within Robintech @ Hillsboro
Hillsboro, Texas (12 ppm Total Hydrocarbon) (background)

I. Injection Molding Machine Area

No detectable level — -0- ppm

II. Fittings Storage Warehouse
No detectable level — -0- ppm

III. Pelletized Compound Boxes
No detectable level — -0- ppm

Robintech Incorporated
Newman, California

(See next page)

| | | Vinyl Chloride |
|---|---|---|
| II. | Extrusion Lines | |
| | A. Area - No detectable level | -0- |
| | B. Inside Pipe | 3 ppm |
| III. | Perimeter of Plant | |
| | No detectable level | -0- ppm |

Robintech Incorporated
Grinnell, Iowa (10 ppm Total Hydrocarbon) (background)

| | | |
|---|---|---|
| I. | Rail Car of Compound | |
| | A. Inside car Opened (Empty) | 40 ppm |
| | B. Inside car freshly opened (Full) | 16 ppm |
| II. | Mixing Area (Transferring to Bins) | |
| | A. Five feet above bin | 3 ppm |
| III. | Extrusion Lines | |
| | Area - No detectable level | -0- ppm |
| IV. | At pipe cutoff Saw | 3 ppm |
| V. | At the Printer above Pipe | |
| | No detectable level | -0- |
| VI. | Grinder Area | |
| | No detectable level | -0- |
| VII. | Perimeter of Plant | |
| | No detectable area | -0- |

V. Perimeter of Plant (total)

No detectable level

Robintech Incorporated (85 degrees F. - 57% Relative Humidity)
Anderson, South Carolina (10ppm Total Hydrocarbon)
(background)

| | Vinyl Chloride |
|---|---|
| I. Rail Car Compound | |
| A. Inside Car Freshly Opened | 190 ppm |
| B. 1-1/2 feet away from Port | -0- ppm |
| II. Blending Room | |
| No blending - during transfer from car<br>No detectable level | -0- |
| III. Extrusion Line | |
| A. Area - No detectable level | -0- |
| IV. Outside perimeter of plant | |
| No detectable level | -0- |

Robintech Subsidiary- SOME INDUSTRIES
Rolla, Missouri (11 ppm Total Hydrocarbon)
(background)

| | |
|---|---|
| I. Rail Car Resin | |
| A. Inside Car freshly opened | 740 ppm |
| B. One and one-half feet from Port<br>No detectable level | -0- |
| C. Above duplicated - same results | |

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June 19, 1974

- PLANT SURVEY -

All the values below were obtained with a Century OVA, Model 98 B Unit which had incorporated the column for specific vinyl chloride monomer. Additional results based on Sipin Pump - Carbon Tube.

Robintech Incorporated
Pace, Florida (10 ppm Total Hydrocarbon) (Background)

| | | Vinyl Chloride |
|---|---|---|
| I. | Rail car of resin | |
| | A. Inside compartment when freshly opened | 490 ppm |
| | B. One and one half foot above port opening - no detectable level | -0- |
| II. | Mixing Room (using Robintech 414-3 Resin) | |
| | A. Five feet from Mixer (Port Open) | 4 ppm |
| | B. Three feet from Mixer Port Opening - (top) (downwind) | 20.5 ppm |
| | C. Three feet from Mixer Port Opening - (top) Up Wind) | 5.5 ppm |
| III. | Extrusion Lines | |
| | Throughout Plant - No detectable level | |
| IV. | Powder Blend Transportation Bins | |
| | Two feet above - No detectable level | |
| | Two inches above compound | 5.0 ppm |

INTER-OFFICE COMMUNICATION THE CONTINENTAL INSURANCE COMPANIES

[redacted]. McNamara AT Industrial Hygienist - Dallas

A. K. Roy-Chowdhury AT Environmental Health Laboratory

[redacted]obintech DATE June 18, 1974
Page 7

| Type Sample | Location | Volume Sampled in liters | Field Sample # | EHL Sample # | Results |
|---|---|---|---|---|---|
| | Above 2 | 10 | D1014 | A1126 | 1.62 ppm |
| | Above 3 | 10 | D1015 | A1127 | 1.11 ppm |
| | #1 station | | D1016 | A1128 | 1.10 ppm |

Should you have any further questions, please advise.

A. K. Roy-Chowdhury, Ph.D.
Supt. of Industrial Hygiene Laboratories

R. A. Rennicks
Director of Industrial Hygiene

INTER-OFFICE COMMUNICATION — THE CONTINENTAL INSURANCE COMPANIES

TO D. McNamara — AT Industrial Hygienist - Dallas

FROM A. K. Roy-Chowdhury — AT Environmental Health Laboratory

SUBJECT Robintech
Page 6 — DATE June 18, 1974

Surveyed by: Ron Kipp, Industrial Hygienist Glens Falls
June 16, 1974, Vestal, New York

| Type Sample | Location | Volume Sampled in Liters | Field Sample # | EHL Sample # | Results |
|---|---|---|---|---|---|
| Zaffar Saleem | Heating & Belling line #5 (also at saw) | 11 | D1000 | A1112 | 0.74 ppm |
| Craig Glis | Heating & belling line #2 - 2AC (also at saw) | 10 | D1001 | A1113 | 0.64 ppm |
| Dick Glis | At extruder head line #2 | 16 | D1002 | A1114 | 0.57 ppm |
| Craig Gilh | Heating & belling line #2 - 2AC (also at saw) | 18 | D1003 | A1115 | 0.64 ppm |
| Zaffar Saleem | Heating & belling Line #5 | 19 | D1004 | A1116 | 0.90 ppm |
| Dick Geis | Heating and belling line #2 - 2AC (also at saw) | 9 | D1005 | A1117 | 0.66 ppm |
| Zaffar Saleem | Heating & belling Line #2 - 2 AC (also at saw) | 14 | D1006 | A1118 | 0.24 ppm |
| - - - | 6" from sizing sleeve line #2 | 13 | D1007 | A1119 | 0.26 ppm |
| Craig Gilh | Heating & belling line #2 - 2 AC (also at saw) | 14 | D1008 | A1120 | 0.31 ppm |
| - - - | Line #5 at heater on belling station, 4" distance | 6 | D1009 | A1121 | 0.43 ppm |
| A. David | #1 Bend fabrication 2 heaters/fab. area #1 | 13 | D1010 | A1122 | 0.56 ppm |
| T. Hromada | #2 bend fabrication "ID to Down Stair" #2 | 13 | D1011 | A1123 | 0.13 ppm |
| D. Martio | #3 bend fabrication process sample 12" above 4R heater | 8 | D1012 | A1124 | 0.51 ppm |
| | Above 1 | 11 | D1013 | A1125 | 0.48 ppm |

7014A INTER-OFFICE COMMUNICATION THE CONTINENTAL INSURANCE COMPANIES

TO D. McNamara AT Industrial Hygienist -Dallas

OM A. K. Roy-Chowdhury AT Environmental Health Laboratory

CT Robintech DATE June 18, 1974
Page 5

Surveyed by: R. Gils, Industrial Hygienist Southeastern Department
June 14, 1974 - Pace, Florida
Mr. Bob Odgers, Plant Manager
Mr. Walt Martin, Technician - Chicago
All samples were collected via Bendix C115 pumps calibrated to .5L before and after each sampling period to assure accuracy.

| Type Sample Location | Volume Sampled in Liters | Field Sample # | EHL Sample # | Results |
|---|---|---|---|---|
| Operates desk end of extruder A4125 | 5 | D5020 | A1130 | 0.00 ppm |
| T. Needhel - Plant Supt. | 5 | D5021 | A1131 | 0.00 ppm |
| B. Hopkins, Line tender | 5 | D5022 | A1132 | 0.16 ppm |
| Raw materials storage area (center of room) | 5 | D5023 | A1133 | 0.66 ppm |
| Blending area on work platform (No blending) | 5 | D5024 | A1134 | 0.25 ppm |
| Blending room floor on top of freshly blended PVC (no blending underway) | 5 | D5025 | A1135 | 0.98 ppm |
| Collected at extruder port during starting up of extruder BT-100 (great deal of smoke) pump stopped functioning between 10-20 minutes after started sampling | >2.5 | D5026 | A1136 | <0.37 ppm |
| Sample conditions same as (D 5026) collected on machine A2280 cooling tank during start-up of unit BT-100 (Great deal of smoke from decomposition of PVC pipe) | 3.75 | D5027 | A1137 | 0.33 ppm |
| Sample conditions same as (D5026) except collected on extruder A4L25 great deal of smoke from decomposition of PVC pipe | 3.5 | D5028 | A1138 | 0.30 ppm |
| Blank | | D5029 | A1139 | 0.00 ppm |

D. McNamara AT Industrial Hygienist - Dallas

A. K. Roy-Chowdhury AT Environmental Health Laboratory

Robintech DATE June 18, 1974
Page 4

| Type Sample | Location | Volume Sampled in Liters | Field Sample # | EHL Sample # | Results |
|---|---|---|---|---|---|
| | C. Hall Maintenance Man | 5 | D5015 | A1049 | 0.00 ppm |
| * | Line #1, on cooling tank | 5 | D5016 | A1050 | 0.07 ppm |
| * | Line #5 west wall | 10 | D5017 | A1051 | 0.04 ppm |
| | Regrind storage Bldg. | 5 | D5018 | A1052 | 1.36 ppm |
| * | Sample between lines 2 & 3 | 10 | D5019 | A1053 | 0.00 ppm |

* Indicates area sample.

Surveyed by: W. C. Christoffer, Industrial Hygienist Western Department
June 14, 1974 - Springfield, Kentucky

| | | | | | |
|---|---|---|---|---|---|
| Per. | Worn by Employee | 15 | D8500 | A1023 | 0.27 ppm |
| Area | Platform above bins being filled | 20 | D8501 | A1024 | 0.26 ppm |
| | Blank | | D8502 | A1025 | 0.00 ppm |
| Line #0 -4" 1 ft. from open extruder head - (flow pulsation was noted on this sample, probably because of heat) | | 20 | D8503 | A1026 | 0.12 ppm |
| Same as above | | 20 | D8504 | A1027 | 0.11 ppm |
| Line #1 - 4" 1 ft. from enclosed extruder head | | 20 | D8505 | A1028 | 0.05 ppm |
| Feed hopper for line #1 between #0 and #1 extruder | | 22 | D8506 | A1029 | 0.21 ppm |
| Same as above | | 15 | D8507 | A1030 | 0.22 ppm |
| Line #5 - 4" - 1ft. from open extruder head | | 16 | D8508 | A1031 | 0.16 ppm |
| Line #4 - 2" by pipe cutter 1.5 ft. from pipe | | 15 | D8509 | A1032 | 0.03 ppm |
| Line #2 - 8" by pipe cutter 1.5 ft. from pipe | | 18 | D8510 | A1033 | 0.03 ppm |
| Line #2 - 8" end of cooling line 1 ft. from pipe | | 20 | D8511 | A1034 | 0.06 ppm |

TO D. McNamara AT Industrial Hygienist - Dallas

FROM A. K. Roy-Chowdhury AT Environmental Health Laboratory

SUBJECT Robintech DATE June 18, 1974
Page 3

Surveyed by: D. J. Going - Pacific Industrial Hygienist
June 14, 1974 - Newman, Ca.
Plant Manager - Gary Zunino
6 extruders (4, 5, 6 off)
Sampling rate 0.1 liters per minute
Bendix C115 pump ser #1074 & 1090

| Type Sample | Location | Volume sampled in liters | Field Sample # | EHL Sample # | Results |
|---|---|---|---|---|---|
| | Blank | | D7011 | A1055 | 0.00 ppm |
| Area | Between 2-3 extruder | 2.1 | D7012 | A1056 | 0.19 ppm |
| Area | Take off between line 1 & 2 | 1.9 | D7013 | A1057 | 0.41 ppm |
| Area | Same as 12 | 2.0 | D7014 | A1058 | 0.88 ppm |
| Per. | J. Alvernaz, line 3 operator 2" Ag pipe | 2.0 | D7015 | A1059 | 0.20 ppm |
| Area | Between 1-2 extruders | 1.8 | D7016 | A1060 | 0.26 ppm |
| Area | Blending Room (No work) | 2.0 | D7017 | A1061 | 0.20 ppm |
| Area | Same as 16 | 2.0 | D7018 | A1062 | 0.20 ppm |
| | Blank | | D7019 | A1063 | 0.00 ppm |

Surveyed by: R. Gils, Industrial Hygienist Southeastern Department
June 12, 1974 - Anderson, S. C.
Person Interviewed - Joe Perry, Manager
All area samples except D5016 and D5018 were collected via a gas pump equipped with a calibrated orifice (1L). All other samples were collected via Bendix C115 pumps calibrated to .5L before and after each sampling period to assure accuracy.

| | | | | |
|---|---|---|---|---|
| G. Hayes, Blending Operator | 5 | D5008 | A1042 | 0.11 ppm |
| Blending Room with blower in operation (PVC pellets being drawn in) | 10 | D5009 | A1043 | 0.04 ppm |
| B. Hargraves, Machine Tender, Line 3 | 5 | D5010 | A1044 | 0.22 ppm |
| C. Price, Machine Tender, Line 4 | 5 | D5011 | A1045 | 0.09 ppm |
| J. Johnson | 5 | D5012 | A1046 | 1.31 ppm |
| A. Dubois, Machine Tender, Line 5 | 5 | D5013 | A1047 | 0.26 ppm |
| Maintenance Shop Center of room | 10 | D5014 | A1048 | 0.04 ppm |

INTER-OFFICE COMMUNICATION — THE CONTINENTAL INSURANCE COMPANIES

McNamara — AT Industrial Hygienits - Dallas

K. Roy-Chowdhury — AT Environmental Health Laboratory

Robintech — DATE June 18, 1974

Page 2

| Type Sampled | Location | Volume Sampled in Liters | Field Sample # | EHL Sample # | Results |
|---|---|---|---|---|---|
| | Mixing * | 15 | D8008 | A1091 | 0.27 ppm |
| | #4 above extruder 1/2-1' | 15 | D8009 | A1092 | 0.06 ppm |
| | #4 Same as 8009 | 15 | D8010 | A1093 | 0.00 ppm |

Surveyed by: Gerry Tovatt - Western Department Industrial Hygienist
June 17, 1974 - Rolla, Missouri
* This plant mixes PVC with Polystyere - Grinnell plant had premixed batches in R. R. cars

| | | | | | |
|---|---|---|---|---|---|
| | Top mixing platform addition of PVC to Polystyene | 15 | D8011 | A1075 | 5.42 ppm |
| * | Underneath mixing platform, auto controls | 15 | D8012 | A1076 | 2.95 ppm |
| | Extruder, same as 8014 #4 | 15 | D8013 | A1077 | 0.34 ppm |
| | Extruder, open to room #4 (low rate had to readjust) | 18 | D8014 | A1078 | 0.49 ppm |
| | #5 extruder, closed train to water | 15 | D8015 | A1079 | 0.14 ppm |
| | #5 extruder | 15 | D8016 | A1080 | 0.70 ppm |
| | #2 extruder, closed train to $H_2o$ | 15 | D8017 | A1081 | 0.33 ppm |
| | #2 extruder | 15 | D8018 | A1082 | 0.28 ppm |
| | Mixing platform, same as 8011 | 15 | D8019 | A1083 | 12.22 ppm |
| Blank | Blank | Blank | D8020 | A1084 | 0.00 ppm |

Sample #A1076 (D8012) was analyzed for breakthrough of second compartment and found to have 2.21 ppm. The quantity of airborne contaminant in the work place would exceed 5.16 ppm as absorption is taking place concurrent with desorption of vinyl chloride on the charcoal tube.

INTER-OFFICE COMMUNICATION — THE CONTINENTAL INSURANCE COMPANIES

D. McNamara — AT Industrial Hygienist - Dallas

A. K. Roy-Chowdhury — AT Environmental Health Laboratory

Robintech — DATE June 18, 1974
Vinyl Chloride Samples

Please receive the following results on air borne samples obtained by our Departmental Industrial Hygienist.

Surveyed by: D. J. Coing - Pacific Industrial Hygienist
June 13, 1974 - Elsimore, Ca.
5 extruders, (3 & 5 off)
Equipment:
SKC Charcoal Tubes
Bendix C115 pump ser#1074 & 1090
Setting: 35 = 0.1 liter/min

| Type Sampled | Location | Volume sampled in Liters | Field Sample# | EHL Sample# | Results |
|---|---|---|---|---|---|
| | Blank | | D7000 | A1064 | 0.00 ppm |
| Per. | M. Rodriguez Machine Tender | 2.0 | D7001 | A1065 | <0.05 ppm |
| Area | Control Pannel #1 Line - 6" pipe IKC | 2.0 | D7002 | A1066 | <0.05 ppm |
| Area | Same as (2) | 2.3 | D7003 | A1067 | <0.05 ppm |
| Area | Between extruder 2-4 | 2.1 | D7004 | A1068 | <0.05 ppm |
| Area | Same as (4) | 2.0 | D7006 | A1069 | <0.05 ppm |
| Per. | A. Harvey Machine Tender | 2.0 | D7005 | A1070 | <0.05 ppm |
| Area | Between 4-5 (5 off) | 2.0 | D7007 | A1071 | <0.05 ppm |
| Area | Same as (7) | 1.8 | D7008 | A1072 | <0.05 ppm |
| Area | Blending Room (No work) | 1.7 | D7009 | A1073 | 0.09 ppm |
| | Blank | | D7010 | A1074 | 0.00 ppm |

Surveyed by: Gerry Tovatt - Western Department Industrial Hygienist
June 17, 1974 - Grinnell, Iowa
1 liter/min
*Sample was taken on edge of bin as PVC filled it from hopper above, cycle actually only lasted 5-6 min.

| | | | | |
|---|---|---|---|---|
| Blank | | D8001 | A1085 | 0.00 ppm |
| #2 extruder 1' away | 15 | D8002 | A1086 | 0.04 ppm |
| 1 foot from extrusion | 15 | D8003 | A1087 | 0.03 ppm |
| Cutting cold tube, 3' away | 15 | D8004 | A1088 | 0.74 ppm |
| Mixing platform | 15 | D8005 | A1089 | 0.00 ppm |
| #5 extruder 1/2-1' | 15 | D8006 | A1090 | 0.05 ppm |

| Sample # | Area | ppm Vinyl Chloride |
|---|---|---|
| 6 | Extruder #1 (Adjacent to Point of Extrusion) | None Detectable* |
| 7 | Extruder #2 (Adjacent to Point of Extrusion) | " " |

*Detectable Limit--.005 ppm

Comments

Vinyl Chloride concentrations in a plant extruding PVC are a direct function of the purity of the polymer resin. The use of a resin with large amounts of unreacted monomer will obviously produce higher air concentrations of vinyl chloride. This data indicates the use of a high quality PVC resin. If this continues, VC air concentration should remain low.

If there are any questions regarding this report, please contact me.

Patrick Murphy
Industrial Hygienist

PM/mde

Original: Mr. Johnny Miller, Plant Manager - Hillsboro
cc: Mr. B. G. Corbett, President - Robintech, Inc. - Ft. Worth
cc: Mr. Ed Bardgett, Director of Industrial Relations - Ft. Worth
cc: Mr. Tom Gastineau - Paul Rathgerber & Company - Ft. Worth
cc: Mr. Charley Griffith, General Manager - Hillsboro
cc: Mr. Kenneth King - Special Risk Department
cc: Mr. Ronald Williams - LC&E Department

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The CONTINENTAL INSURANCE COMPANIES

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*1810 Commerce Street, Dallas, Texas 75201*

May 29, 1974

INDUSTRIAL HYGIENE SURVEY

ROBINTECH, INC.
PLASTIC PIPE PLANT
HILLSBORO, TEXAS

MAY 10, 1974

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On May 10, 1974, an industrial hygiene survey was conducted at the above location to determine concentrations of vinyl chloride in the working atmosphere. Recent studies have implicated vinyl chloride as the possible cause of a rare form of liver cancer known as angiosarcoma. Present Federal standards limit permissible working air concentrations of vinyl chloride to a ceiling value of 50 parts per million. A new standard has been proposed, however, which would make any detectable level of vinyl chloride a violation (based on a method sensitive to 1 part per million).

Battery-operated MSA Monitaire Pumps were used in conjunction with activated charcoal tubes to collect seven (7) air samples in the resin mixing and extrusion areas. Subsequent analysis by gas chromatography yielded the following results:

| Sample # | Area | ppm Vinyl Chloride |
|---|---|---|
| 1 | Resin Mixing Area (Operator's Breathing Zone) | 0.4 |
| 2 | Mixed Resin Storage Area | 0.1 |
| 3 | Resin Mixing Area (No Activity) | None Detectable* |
| 4 | Extruder #1 (Operator's Breathing Zone) | " " |
| 5 | Extruder #1 (Adjacent to Point of Extrusion) | " " |

Ex 20-R

Statement of:

Rodney P. Becker

Manager, PVC Application and Technical Service
Diamond Shamrock Chemical Company
Plastics Division

Prepared for presentation at:

Department of Labor Hearings on Vinyl Chloride;
Occupational Exposure Standard
June 25, 1974

4138

V. Resin shipment and handling areas require reasonable work procedures and simple ventilation.

These conclusions are based upon facts that we believe are not only reliable, but typical. Furthermore, all of the data was developed by the methodology referenced in Appendix II and we believe the data to be accurate and reproducible.

Information developed in our applications lab is representative of commercial processing plants since the equipment is of production size and type. However, data from the applications lab merely formed a starting point for the testing which was conducted at commercial production facilities which utilized a broad spectrum of PVC resins and compounds.

Our first conclusion, dealing with processing flexible PVC compounds, is supported by data in Tables I and II in the Appendix and can be summarized as follows:

(a) In testing 14 flexible compound samples, we consistently found less than 20 ppm residual VCM. Thus, there is negligible VCM available for emission into the work atmosphere. (Data presented in Table I)

(b) Personnel and area sampling at a flexible PVC tubing manufacturer showed VCM levels of less than 1 ppm. The material being extruded was a typical flexible PVC pellet compount. (Data presented in Table II)

(c) Personnel air sampling at a flexible profile extruder operation showed 1 ppm maximum VCM on all samples. (Data presented in Table II)

My name is Rodney P. Becker and I am Manager of PVC Applications and Technical Service for Diamond Shamrock's Plastics Division. My group has spent the past several months characterizing the residual[1] VCM content of various polyvinyl chloric (PVC) resins and compounds from time of shipment through handling and processing steps to the final fabricated article. During the course of this work, we also monitored numerous processing facilities for personnel exposure to airborne[2] VCM. Thus, our program was useful for examining the relationship between residual VCM concentration in PVC resins and compounds and the concentration of VCM emitted to the ambient air in the workplace during processing.

Our work was primarily directed at operations that use what is commonly known as "general purpose PVC." This term describes homopolymer PVC resin manufactured by either the suspension or bulk polymerization technique. Resins manufactured by these methods are used to fabricate such items as flexible packaging films, molded fittings, pipe, building products, bottles, sheet, and other items. It is estimated that such resins make up approximately 75-80% of the yearly production of PVC.

Several key conclusions suggested by our work are:

I. Fabricators using flexible[3] PVC compounds (powders or pellets) should not encounter VCM exposure problems with their personnel.

II. Fabricators using rigid PVC pellets should not encounter VCM exposure problems with their personnel.

III. Fabricators using dryblend compounds produced by high intensity mixing do not have a VCM personnel exposure problem.

IV. Normal dryblend compounding operations, with conventional plant ventilation, present no VCM exposure problems in the operator breathing zones. Furthermore, subsequent pelletizing operations present no VCM exposure problems to operating personnel.

(d) Personnel air sampling at a flexible blow molder showed less than 1 ppm airborne VCM on all samples. (Data presented in Table II)

The results of our investigations at fabricators using rigid PVC pellets supports our conclusion regarding the absence of VCM in worker exposure areas. This data is contained in Tables III and IV of the Appendix and is summarized as follows:

(a) While injection molding 3 inch couplings on our lab molding machine, area sampling showed 1 ppm airborne VCM. In this test the pellets had a residual VCM content of 180 ppm and the air sample was taken in the hopper. A later molding trial was conducted using pellets that contained an abnormally high residual VCM concentration of 1800 ppm. Area and personnel samples obtained while processing these pellets at normal operating conditions showed airborne VCM to be less than 1 ppm. An extreme airborne VCM sample was obtained when the machine was open air purged for ten minutes. This resulted in a concentration of 12 ppm airborne VCM in the immediate nozzle area. We do not consider this sample area to be a regular worker breathing zone nor do we consider these pellets to have typical residual VCM concentrations. (Data presented in Table III)

(b) A sheet extrusion trial on our lab 2-1/2" extruder was monitored for personnel exposure. All samples showed less than 1 ppm airborne VCM and the feed pellets had a residual VCM level of 662 ppm. (Data presented in Table III).

(c) Air monitoring at a commercial injection molding plant yielded exposure measurements as high as 2 ppm (5 of 18 samples were equal to or above 1 ppm but not greater than 2 ppm; the remaining 13 were all less than 1 ppm). (Data presented in Table III)

(d) Personnel and area sampling (8 different tests) at a sheet extrusion plant showed VCM levels below 2 ppm. Residual VCM in the rigid pellets was 312-390 ppm. (Data presented in Table III)

(e) On several occasions we analyzed for residual VCM in rigid pellets and the resultant fabricated products. This testing showed that only small residual VCM losses occurred during processing. Thus, it is not surprising that airborne VCM concentrations are very low. (See Table IV).

Dryblend compounds produced by high intensity mixing typically have low residual VCM concentration (less than 1 to 80 ppm). Table V of the Appendix contains all of the information we have obtained in plants that process these dryblends and supports our view that there is no personnel exposure problem. A summary of this data is as follows:

(a) A pipe plant, using purchased rigid PVC dryblend, had no area sample containing more than 1 ppm airborne VCM. The dryblends being processed had residual VCM concentrations from less than 1 to 27 ppm.

(b) A pipe plant, using dryblend compound prepared in house, had no personnel exposures greater than 1 ppm (seven samples taken). Residual VCM in the dryblend ranged from 27 to 50 ppm.

(c) A typical flexible film extrusion plant was monitored for airborne VCM. Five air samples were evaluated and all showed less than 1 ppm.

(d) Several rigid extrusion tests were run at our laboratory on commercial sized equipment. We extruded rigid dryblends (at about 180 lbs. per hour) into pipe and rigid foam profile. Area samples showed airborne VCM concentrations to be less than 4 ppm. Residual VCM in the dryblends ranged from 18 to 40 ppm.

Table VI of the Appendix shows that normal dryblend operations do not present VCM personnel exposure problems. In summary, this data indicates:

(a) Our Deer Park compounding plant produces rigid dryblends with high intensity mixers. Sampling of operating personnel indicated one exposure value of 9 ppm and twelve values less than 3 ppm. The input resin averages 250 $\pm$ 100 ppm residual VCM.

(b) Two flexible dryblend operations were monitored for airborne VCM exposures. Three personnel samples showed airborne VCM concentration less than 1 ppm while one sample gave a 2 ppm result. Residual VCM in the resins ranged from 90 to 629 ppm.

(c) A compounder converting resin to dryblend and subsequently to pellets was tested. Four personnel samples showed airborne VCM to be less than 1 ppm. Residual VCM in the resin ranged from 72 to 117 ppm.

(d) We have monitored the personnel in the mixing operation at our applications laboratory and all airborne VCM results have been less than 1 ppm. (Seven samples). Residual VCM in the resin ranged from 20 to 50 ppm.

Resin shipment and handling may require an alteration of existing work procedures and practices. Table VII of the Appendix contains some limited data showing airborne VCM levels in shipping and storage areas. Comments pertinent to this information are as follows:

(a) The airborne VCM numbers (up to 150 ppm) found immediately above the resin in storage silos do not present a hazardous situation since personnel do not work in these areas. Furthermore, these readings are high because of little air movement and because VCM is more than twice as dense as air. If a worker must enter such a silo, the resin should first be removed and the vessel ventilated.

(b) Bagged PVC resin dissipates VCM during storage and therefore airborne VCM can be expected in ambient air in warehouses. We found airborne VCM levels up to 8 ppm in the immediate vicinity of freshly bagged PVC. Simple ventilation in resin storage areas will eliminate even these trace concentrations of airborne VCM.

(c) Monitoring inside closed bulk rail cars and trucks for airborne VCM has shown high concentrations in these confined areas. These concentrations are the direct result of having very small air volumes and no ventilation. The potential VCM exposure problem in these cases can be effectively and easily dealt with by venting prior to any employee's entrance.

We believe the data I have just reviewed demonstrates that PVC fabricators and compounders using materials which contain less than 0.1% (1,000 ppm) unreacted vinyl chloride monomer are not exposed to any significant airborne VCM hazard and should therefore be exempt from coverage under the final regulation.

Given the extremely low levels of VCM found in ambient air in plants using resins containing unreacted monomer in ranges up to 1,000 ppm and in some cases, even higher, we can see no real need for the SPI recommendation that the exemption level be lowered to 100 ppm in 1977.

Footnotes:

[1] Residual VCM

This is the concentration of Vinyl Chloride Monomer, on a weight/weight basis, remaining in a PVC resin or article. For example, the phrase, "1 ppm residual VCM" means that there is 1 pound of VCM in 1,000,000 pounds of PVC product.

[2] Airborne VCM

This is the concentration of Vinyl Chloride Monomer, on a volume/volume basis, in air. For example, the phrase, "1 ppm airborne VCM" means that there is 1 liter of VCM in 1,000,000 liters of air.

[3] Flexible PVC

For this report, we have defined a flexible as any PVC material with 20% (or more) plasticizer.

# A P P E N D I C E S

## APPENDIX I

Figure 1 - Flow Diagram - PVC Resins to End Products

Table I - Flexible PVC (Residual VCM)

Table II - Flexible PVC Processing (Airborne VCM)

Table III - Rigid Pellet Processing

Table IV - Rigid PVC Products (Residual VCM)

Table V - Dryblend Processing

Table VI - Compounding

Table VII - Shipping and Handling

Company Legend

## APPENDIX II

Residual Analytical Methodology

Airborne Analytical Methodology

# APPENDIX I

## FIGURE I

## PVC RESINS TO END PRODUCT

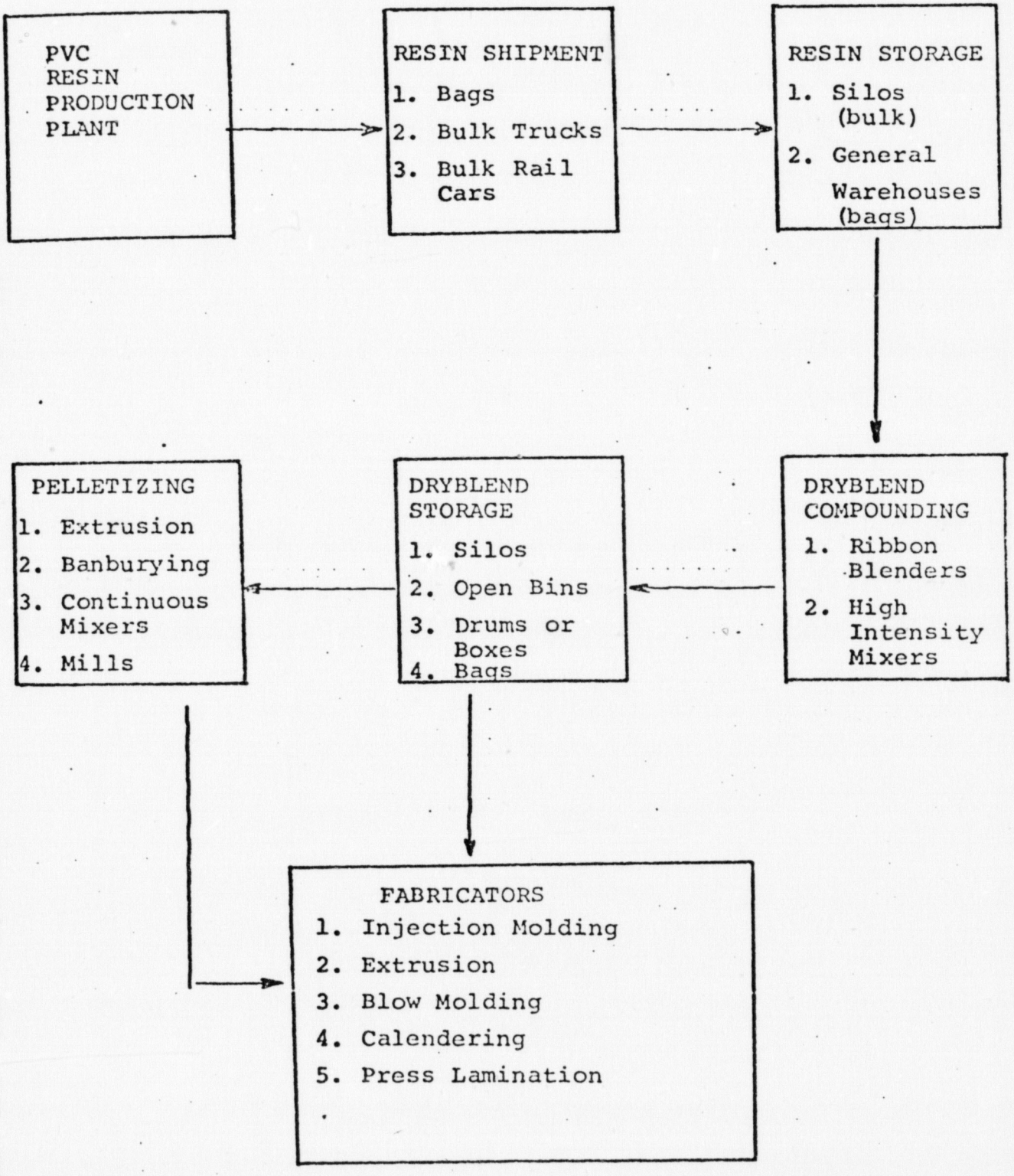


TABLE I

FLEXIBLE PVC (RESIDUAL VCM)

| Company[1] | Type of Sample | Residual VCM (ppm)[2] | Remarks |
|---|---|---|---|
| A | Flexible compound dryblend | 15 | Input resin 72 ppm residual VCM |
| | Flexible compound pellet | 1 | Input dryblend 15 ppm residual VCM |
| | Flexible compound dryblend | 12 | Input resin 12 ppm residual VCM |
| | Flexible compound pellet | <1 | Input dryblend 12 ppm residual VCM |
| | Flexible compound dryblend | 10 | Input resin 157 ppm residual VCM |
| | Flexible compound pellet | <1 | Input dryblend 10 ppm residual VCM |
| | Flexible compound pellet | <1 | --- |
| | Flexible compound pellet | <1 | --- |
| B | Flexible compound dryblend | 2 | Input resin 411 ppm residual VCM |
| | Flexible compound dryblend | <1 | Input resin 629 ppm residual VCM |
| C | Flexible compound dryblend | 6 | Input resin 72 ppm residual VCM |
| D | Flexible compound pellet | <1 | DACOVIN 4579 |
| | Flexible compound pellet | 2 | DACOVIN 4609 |
| E | Flexible compound pellet | <1 | --- |

(1) See company legend for brief description
(2) All data reported to nearest whole number

TABLE II

FLEXIBLE PVC PROCESSING (AIRBORNE VCM)

| Company[1] | Type of Sample | Airborne[2] VCM (ppm) | Remarks |
|---|---|---|---|
| A | Area | <1 | Over tubing extrusion die |
| F | Area | <1 | Extruder #4 on 5/22/74 |
| | Area | <1 | Post extrusion machine on 5/22/74 |
| | Area | <1 | Extruder #4 on 5/29/74 |
| | Area | <1 | Post extrusion machine on 5/29/74 |
| | Area | <1 | Extruder #4 on 6/5/74 |
| | Personnel | <1 | Post extrusion machine on 6/5/74 |
| | Personnel | 1 | Extruder operator on 5/22/74 |
| | Personnel | <1 | Post extrusion machine operator on 5/22/75 |
| | Personnel | <1 | Extruder operation on 5/29/74 |
| | Personnel | <1 | Post extrusion machine operator on 5/29/74 |
| | Personnel | <1 | Extruder operator on 6/5/74 |
| | Personnel | <1 | Post extrusion machine operator on 6/5/74 |
| G | Area | <1 | Blow molding machine on 5/10/74 |
| | Area | <1 | Blow molding machine on 5/17/74 |
| | Area | <1 | Blow molding machine on 5/24/74 |
| | Personnel | <1 | Blow molding machine operator on 5/10/74 |
| | Personnel | <1 | Blow molding machine operator on 5/17/74 |
| | Personnel | <1 | Blow molding machine operator on 5/24/74 |

(1) See company legend for brief description
(2) All data reported to nearest whole number

5/19/74

## TABLE III

## RIGID PELLET PROCESSING

| Company[1] | Type of Sample | Residual[2] VCM (ppm) | Airborne[2] VCM (ppm) | Remarks |
|---|---|---|---|---|
| D | Area | 180 | 1 | Inside laboratory injection molding hopper |
| | Area | 662 | <1 | Laboratory extruder sheet die |
| | Area | 662 | <1 | Laboratory extruder vent hood over sheet die |
| | Personnel | 662 | <1 | Laboratory extruder |
| | Area | 1800 | <1 | Inside laboratory injection molding hopper |
| | Area | 1800 | <1 | Laboratory injection mold nozzle area |
| | Area | 1800 | 12 | Laboratory injection mold air shots |
| | Personnel | 1800 | <1 | Laboratory injection mold operator |
| H | Area | (a) | <1, 2, <1 | Injection molding presses tested on 5/15/74 |
| | Area | (a) | <1, 1, <1 | Injection molding presses tested on 5/24/74 |
| | Area | (a) | <1,<1, <1 | Injection molding presses tested on 5/31/74 |
| | Personnel | (a) | 1, 1, 2 | Injection molding operators tested on 5/15/74 |
| | Personnel | (a) | <1, <1, <1 | Injection molding operators tested on 5/24/74 |
| | Personnel | (a) | <1, <1, <1 | Injection molding operators tested on 5/31/74 |

(1) See company legend for brief description
(2) All data reported to nearest whole number
(a) Not determined

TABLE III (Continued)

| Company[1] | Type of Sample | Residual[2] VCM (ppm) | Airborne[2] VCM (ppm) | Remarks |
|---|---|---|---|---|
| I | Area | 312-390 | 2 | Over sheet line extrusion die (6/12/74) |
| | Area | 312-390 | 1 | Over plate line die (6/12/74) |
| | Area | 312-390 | 1 | Lamination press (6/12/74) |
| | Area | (a) | 1 | Printing Department (6/12/74) |
| | Personnel | (a) | 1 | Sheet extruder operator (6/12/74) |
| | Personnel | (a) | 1 | Plate operator (6/12/74) |
| | Personnel | (a) | 1 | Grinder operator (6/12/74) |
| | Personnel | (a) | 1 | Laboratory technician |

(1) See company legend for brief description
(2) All data reported to nearest whole number
(a) Not determined

TABLE IV

RIGID PVC PRODUCTS (RESIDUAL VCM)

| Company[1] | Type of Sample | Residual VCM (ppm)[2] | Remarks |
|---|---|---|---|
| D | Rigid PVC film | 470 | Input pellets had 662 ppm residual VCM |
| | Rigid PVC Pipe Fittings | 175 | Input pellets had 180 ppm residual VCM |
| | Rigid PVC Pipe Fittings (Air Shot) | 1400 | Input pellets had 1800 ppm residual VCM |
| J | Rigid PVC Pipe Fittings | 345 | Input pellets had 266 ppm residual VCM |

(1) See company legend for brief description
(2) All data reported to nearest whole number

TABLE V

DRYBLEND PROCESSING

| Company[1] | Type of Sample | Airborne[2] VCM (ppm) | Remarks |
|---|---|---|---|
| K | Area | <1 | End of pipe extrusion line using compound with<1 ppm residual VCM |
| | Area | <1 | End of pipe extrusion line using compound with 27 ppm residual VCM |
| | Area | <1 | Extrusion die using compound with 27 ppm residual VCM |
| | Area | <1 | Pipe cut off saw. |
| L | Area | <1, <1, <1 | Extruder die using compound with 27 to 50 ppm residual VCM |
| | Area | <1 | Scrap grinder |
| | Area | <1 | Pipe belling operation |
| | Personnel | <1 | Maintenance operator |
| | Personnel | <1 | Extruder operator |
| B | Personnel | <1 | Operator unloading dryblend |
| | Area | <1 | End of film extrusion line |
| | Area | <1 | Scrap grinder |
| | Area | <1, <1 | Dryblend storage for extrusion |
| D | Area | 4 | #2 laboratory pipe extruder (die hood) |
| | Area | 2 | #3 laboratory foam profile line (die hood) |
| | Area | <1 | #2 laboratory pipe line die hood using compound with 40 ppm residual VCM |
| | Area | <1 | #2 laboratory pipe line die hood using compound with 18 ppm residual VCM |

(1) See company legend for brief description
(2) All data reported to nearest whole number

TABLE VI

COMPOUNDING

| Company[1] | Type of Sample | Residual[2] VCM (ppm) | Airborne[2] VCM (ppm) | Remarks |
|---|---|---|---|---|
| D | Personnel | 250 ± 100 | 1 | #2 Dryblend compound unit operator (4/22/74) |
| | Personnel | 250 ± 100 | 1 | #5 Dryblend compound unit operator (4/22/74) |
| | Personnel | 250 ± 100 | 2 | #1 Dryblend compound unit operator (4/23/74) |
| | Personnel | (a) | <1 | Operator unloading raw material box car (4/23/74) |
| | Personnel | (a) | 1 | Operator packaging dryblend compound (4/30/74) |
| | Personnel | 250 ± 100 | 2 | Operator running dryblend compound units #1 and #2 (5/1/74) |
| | Personnel | (a) | 3 | Maintenance operator (5/2/74) |
| | Personnel | (a) | <1 | Operator load dryblend compound into bulk truck (5/14/74) |
| | Personnel | (a) | <1 | Compound supervisor (5/17/74) |
| | Personnel | 250 ± 100 | 2 | Compound dryblend operator #2 unit (5/22/74) |
| | Personnel | 250 ± 100 | 9 | #1 compound dryblend operator (5/28/74) |
| | Personnel | (a) | <1 | Compound plant laboratory technician (5/22/74) |
| | Personnel | (a) | 1 | Compound plant laboratory technician (5/29/74) |
| B | Personnel | 441 - 629 | 2 | Dryblend mixer operator |
| | Personnel | (a) | <1 | Dryblend mixer operator |

(1) See company legend for brief description
(2) All data reported to nearest whole number
(a) Not determined

TABLE VI (Continued)

| Company[1] | Type of Sample | Residual[2] VCM (ppm) | Airborne[2] VCM (ppm) | Remarks |
|---|---|---|---|---|
| C | Personnel | 72 | <1 | Dryblend mixer operator |
| | Personnel | 72 | <1 | Dryblend mixer operator |
| A | Personnel | 117 | <1 | Man sampling resin railcar |
| | Personnel | 72 | <1 | Blender operator mixing resin |
| | Personnel | 15 | <1 | Banbury operator mixing material |
| | Personnel | 15 | <1 | Material handler moving compound |
| | Area | (a) | <1 | Over blender in exhaust hood |
| D | Personnel | 20 - 50 | <1, <1, <1 <1, <1, <1 <1 | Laboratory mixer operator |
| F | Area | (a) | 3 | Pelletizing die (5/22/74) |
| | Area | (a) | <1 | Pelletizing die (5/29/74) |
| | Area | (a) | <1 | Pelletizing die (6/5/74) |
| | Personnel | (a) | <1 | Pelletizing operator (5/22/74) |
| | Personnel | (a) | <1 | Pelletizing operator (5/29/74) |
| | Personnel | (a) | <1 | Pelletizing operator (6/5/74) |
| L | Personnel | 90 - 100 | <1 | Mixer operator |
| | Personnel | 90 - 100 | <1 | Mixer operator |
| | Area | 90 - 100 | <1 | Mixer dryblend area |

(1) See company legend for brief description
(2) All data reported to nearest whole number
(a) Not determined

TABLE VII

SHIPPING AND HANDLING

| Company[1] | Type of Sample | Residual[2] VCM (ppm) | Airborne[2] VCM (ppm) | Remarks |
|---|---|---|---|---|
| L | Area | 90-100 | 122 | Inside resin storage silo- one foot above resin surface |
| | Area | 50 | 149 | Inside dryblend storage silo- one foot above freshly made compound |
| | Area | (a) | 3 | Inside ventilation dust sock house - exhaust side |
| D | Area | | | Next to bagged PVC resin pallets on the following dates: |
| | | | 8 | 3/29/74 |
| | | | 2 | 4/3/74 |
| | | | <1 | 4/4/74 |
| | | | 6 | 6/5/74 - new resin shipment |
| | | | 1 | 6/13/74 |
| | Area | 40 - 211 | 16 | Monitoring inside truck carrying bagged PVC resin |
| | Area | 267 | (a) | Bagged resin in storage for 2 weeks - initial concentration was 380 ppm of residual VCM |
| | Area | (a) | 42 | Inside sealed dead air space of bulk car after 4 days of storage - not a worker breathing area |
| | Area | 60 - 175 | 5 | Inside sealed dead air space of bulk car after 2 month storage - not a worker area |
| | Area | 42 - 46 | 16 | Inside trailer truck load freshly produced resin |

(1) See company legend for brief description
(2) All data reported to nearest whole number
(a) Not determined

Note: The notation <1 should be read as "less than 1".

## COMPANY LEGEND

| Company | Type of Operation |
|---|---|
| A | Flexible PVC compounder (dry blends and pellets). Also manufactures flexible tubing. |
| B | Flexible PVC film manufacturer. |
| C | Flexible PVC film manufacturer. |
| D | Diamond Shamrock |
| E | Flexible PVC tubing manufacturer. |
| F | Flexible profile extruder (automotive accessories). |
| G | Flexible blow molder (toys). |
| H | Rigid and flexible injection molding operation. |
| I | Rigid sheet and film manufacturer - uses rigid PVC pellets. |
| J | Pipe extruder and fitting molder. |
| K | Rigid PVC pipe producer. |
| L | Rigid PVC pipe producer - does in-house dry blending. |

Ex 20-S

Statement of Philip J. Weaver
Director of Industry Affairs, B.F.Goodrich Chemical Company
Prepared For
Presentation At
Department of Labor Hearings On
Vinyl Chloride, Occupational Exposure Standard
June 25, 1974

My name is Philip J. Weaver. I am Director of Industry Affairs, B.F.Goodrich Chemical Company, a Division of The B.F.Goodrich Company. I graduated from Purdue University with a B.S. degree in Chemical Engineering in 1942.

Most of my assignments for the past 31 years with B.F.Goodrich have been closely aligned to the application and use of polyvinyl chloride materials by the plastics industry. I spent most of my time as a technical service expert in plastic processor plants for ten years. I have had plant experience in all conventional types of PVC processing plants.

I spent many years supervising work on the application and performance characteristics of PVC materials in product application laboratories and in market development activities. In addition, for a two-year period, I supervised staff services at our Technical Center, including safety programs and analytical services.

Most recently, as Manager of National Accounts, I was concerned with the requirements of multi-plant customers, and on my present assignment, I am involved with general industry problems such as presented by the proposed OSHA Standard on vinyl chloride.

I have prepared this statement to be submitted on behalf of the Vinyl Chloride (VC) and Polyvinyl Chloride (PVC) Producers Committee of The Society of The Plastics Industry (SPI). The statement will demonstrate that workers in PVC processor plants are not normally exposed to detectable levels of vinyl chloride gas -- i.e., levels of 1.0 ppm $\pm$ 50 percent. Therefore, processors of PVC should be viewed in a different light with respect to the proposed permanent standard.

Processors handle and process PVC resins, PVC pre-mixed compounds, PVC latexes (PVC suspended in water), and PVC resin dispersed or dissolved in plasticizer or solvents. There are at least 3,000, and possibly 4,000, such processing plants in the United States. Generally speaking, these plants are owner managed small businesses. The average number of workers per shift is estimated to be 10 to 20 in a typical PVC processing plant. These typically small companies, which are a most important segment of the plastics industry, generally do not have the highly scientific capabilities required for detection of vinyl chloride at 1 ppm $\pm$ 50 percent as detailed in OSHA's proposed permanent standard.

In order to provide general guidance for PVC processors, we determined the level of worker exposure to vinyl chloride in fourteen processing plants using various types of PVC materials. A scientific team supervised personal monitoring of the workers. The air samples collected in glass collecting tubes and in charcoal traps were tested according to a NIOSH recommended

procedure utilizing a gas chromatograph and backed up with additional sophisticated equipment in 10 of the 14 plants tested to specifically identify vinyl chloride gas. The research equipment provided accuracy in the range of 0.05 to 0.10 ppm. I will give details of one report and summarize the others.

Monitoring - Plant #12

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC medium porosity resin (B.F.Goodrich No. 300X6 and Diamond Shamrock No. 450) with hot powder mixing and extrusion equipment used to make rigid vinyl house siding and accessories. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. instrument and computer to attain detection levels of 0.1 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Extruder Operator | N.D. |
| Extruder Operator | N.D. |
| Mixer Operator - mezzanine | 0.13 Trace |
| Asst. Mixer Operator - floor level | N.D. |
| Materials handler - raw materials | N.D. |
| Grinder Operator | N.D. |
| Packer | 0.06 Trace |
| Day Worker - extrusion area | N.D. |
| Warehouse man | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Personal Monitoring of PVC Processing Workers

| Plant Mfg. | Type PVC Material Used | Type Process | No. of Operators Monitored | Results Greater th 1.0 ppm VC |
|---|---|---|---|---|
| Floor Covering | PVC Dispersion Resin | Mix & coating | 9 | None |
| Bottle Cap Closures | PVC High Porosity Resin | Mix & Extrusion | 10 | None |
| House Siding & Accessories | PVC Rigid Compound-Cubes | Extrusion & Molding | 8 | None |
| Drain, Waste & Vent Pipe | PVC Pipe Grade Resin | Mix & Extrusion & Molding | 10 | None |
| Blister Packaging Sheet | PVC Low Porosity Resin | Mix & Extrusion | 10 | None |
| Refrigerator Door Gaskets | PVC Plasticized Powder Compound | Extrusion & Fabrication | 5 | None |
| Molding & Dipping Liquids | PVC Dispersion Resin | Cold Mixing | 4 | None |
| Appliance Gaskets | PVC High Porosity Resin | Mix & Extrusion | 7 | 1 |
| Pre-mixed Compound | PVC Medium Porosity Resin | Mix Powder & Heavy Duty Mixing | 5 | None |
| Flexible Tubing & Shapes | PVC High Porosity Resin | Mix & Extrusion | 8 | None |
| Pipe | PVC Rigid Compound-Cubes | Extrusion | 9 | None |
| House Siding & Accessories | PVC Medium Porosity Resin | Mix & Extrusion | 9 | None |
| Non-Woven Batting | PVC Latex | Spray & Fusion | 5 | 1 |
| Flexible Shapes | PVC Plasticized Compound-Cubes | Extrusion | 3 | None |
| Total - 14 plants | 8 basic types of PVC materials | 8 different processes | 102 | 2 |

In summary, 102 workers were monitored in 14 PVC processing plants using 8 basic types of PVC materials in 8 different manufacturing processes.

The typical result was non-detectable based on 1 ppm $\pm$ 50 percent accuracy. One worker was exposed to 1.25 ppm and one was exposed to 14.2 ppm while operating a makeshift supply system to a PVC latex spraying operation. In this latter situation, the normally used gravity feed system from a supply tank was not operating.

PVC resin, when hot mixed, releases residual vinyl chloride gas which must be exhausted. If proper ventilation is provided, the exposure is generally non-detectable in the work areas of forming, shaping, molding, coating and packaging as shown by data in this statement.

We acknowledge that there are some areas where there may be detectable quantities of vinyl chloride and where appropriate work practice and engineering control procedures might be required.

The following specific space sample data is submitted for information even though the samples were taken in non-work areas:

| General Space Area | Specific Sample Area | Vinyl Chloride PPM |
|---|---|---|
| Mixing of PVC Compound | Inside - low speed mixer - cold | 26 |
| | Inside - low speed mixer - hot | 84 |
| | Inside - high speed mixer @ 100°F. | 72 |
| | @ 190°F. | 310 |
| | @ 230°F. | 440 |
| | Inside - cool down mixer | 5 - 10 |
| | Over - storage bin - after cooled | 1 |
| Unloading PVC Resin | Inside bulk car - air space above resin | 1520 |
| | Inside tank car - air space above latex | 1770 |
| | Inside box - air space above 1,500 lbs. of warm pre-mixed compound | 20 - 150 |
| | Inside bag - air space above resin | 1 - 10 |

(If a worker does not purge the air space in a bulk car before taking samples, he may be exposed momentarily to 5 - 30 ppm of vinyl chloride.) Proper ventilation would reduce exposure to acceptable levels.

Paragraphs 1910.93q (a) (1) and (b) (4) would impose the provisions of the proposed standard on any area where vinyl chloride is capable of being released. This could cover all processors of PVC resin, PVC compound, and specialty PVC materials, such as latex and solutions of PVC.

We object to this blanket inclusion. Our data does not support this concept of inclusion of such processor operations. We find no detectable levels of vinyl chloride in most of the processing work places. Possible exposure, at varying levels, may occur in unloading, warehousing, or during mixing if appropriate engineering and work practice programs have not been implemented.

We urge that the standard be amended to exclude processor work areas or that a separate standard be developed to permit a processor to exclude most of his work areas from coverage after certification that he has provided for engineering control methods and a work practice program for the possible areas of exposure.

With appropriate control methods, exposure to VC in the processor's plant would be rare. We recommend the elimination of all other items in the proposed rules; namely, respiratory protection for vinyl chloride, protective clothing, medical surveillance, records and reports, and monitoring.

As pointed out in other SPI testimony, a majority of the PVC resin manufacturers have set a goal of reducing residual vinyl chloride in vinyl resins to 100 ppm by October, 1977, thus further minimizing exposure levels in PVC processor plants. It should be noted that the current levels of residual vinyl chloride are very low in many types of resins, i.e., in high porosity resins, in fine particle size dispersion resins, in pre-mixed compounds, and in a number of general purpose resins.

Reports of personal monitoring in 14 PVC processor plants are attached.

Monitoring - Plant #1

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC dispersion resins (B.F.Goodrich No. 121 and Diamond Shamrock No. 71) with cold mixing, reverse roll coating and fusion equipment used to make resilient floor covering. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. instrument and computer to attain detection levels of 0.1 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Operator #1 - plastisol mixing | 0.3 Trace |
| Operator #2 - plastisol mixing | N.D. - Non-Detectable |
| Operator - plastisol deaeration | N.D. |
| Operator #1 - reverse roll coater | N.D. |
| Operator #2 - reverse roll coater | N.D. |
| Operator - oven | N.D. |
| Operator - Wind-up | N.D. |
| Fork Lift Driver - shipping | N.D. |
| Operator - printing line | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #2

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC high porosity resin (B.F.Goodrich No. 92) with hot mixing extrusion and stamping equipment used to make bottle cap closures. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. instrument and computer to attain detection levels of 0.1 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Blend Plant Operator - Platform | 0.1 Trace |
| Blend Plant Operator - Boxing Area | 0.1 Trace |
| Blend Plant Operator - Platform | N.D. |
| Blend Plant Operator - Boxing Area | N.D. |
| Extruder Operator - | N.D. |
| Extruder Operator - Die Tear Down | N.D. |
| Cap Inspector - 1 - | N.D. |
| Cap Inspector - 2 - | N.D. |
| Chopper Operator - Scrap Processing | N.D. |
| Extruder Operator - | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #3

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC Rigid Compound - Cubes (B.F.Goodrich No. 7082) with extrusion, injection molding, and vacuum forming equipment used to make rigid vinyl house siding and accessories. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. instrument and computer to attain detection levels of 0.05 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Extruder Operator | N.D. |
| Grinder Operator | N.D. |
| Injection Mold Operator | 0.08 Trace |
| Extruder Operator | N.D. |
| Vacuum Forming Operator | 0.09 Trace |
| Fabricator | N.D. |
| Extruder Operator | N.D. |
| Die Dismantler | 0.06 Trace |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #4

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC pipe grade resin (B.F.Goodrich No. 103EPF76) with extrusion, injection molding and sawing equipment used to make rigid vinyl DWV construction pipe and fittings. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. instrument and computer to attain detection levels of 0.1 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Operator - Mixing Room - PVC | N.D. |
| Production Worker-PVC-Extrusion-Saw | N.D. |
| Die Setter - PVC extrusion at die | N.D. |
| Floor Worker-PVC-Inj.Molding-Packaging | N.D. |
| Production Worker-PVC (saw-packaging) | N.D. |
| Production Worker-PVC (saw packaging) | N.D. |
| Operator - Blending - PVC | N.D. |
| Die Setter - PVC - extrusion (die) | N.D. |
| Hopper grinder & filler-PVC-Inj.Molding | N.D. |
| Machine Operator-PVC-Inj.Molding | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #5

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC low porosity and low molecular weight resin (B.F.Goodrich No. 80X5) with hot mixing and sheet extrusion equipment used to make rigid vinyl sheet for blister packaging. The charcoal trap collection method was utilized plus a gas chromatograph backed up by a Mass Spec. instrument to attain detection levels of 0.05 ppm. These are time weighted average (TWA) data based on four hour exposures.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Mixing Operator | 0.09 Trace |
| Extruder Operator | 0.07 Trace |
| Mixing Operator | 0.08 Trace |
| Mixing Operator | 0.11 Trace |
| Line Operator | 0.07 Trace |
| Mixing Operator | 0.19 Trace |
| Extruder Operator | 0.04 Trace |
| Extruder Operator | 0.03 Trace |
| Extruder Operator | 0.04 Trace |
| Extruder Operator | 0.03 Trace |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #6

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC plasticized compounds as premixed powders (several B.F.Goodrich compounds used) with extrusion plus sealing and trimming fabricating equipment used to make gaskets for refrigerators and dishwashers. The charcoal trap collection method was used plus a gas chromatograph. A Mass Spec. was not used to rule out interference of other hydrocarbons. Detection levels of total hydrocarbon identified as vinyl chloride should be in the range of 0.1 to 0.2 ppm. These are time weighted average (TWA) data based on approximately two hour exposures.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| General atmosphere between extruders - Foreman Area | 0.46 Trace |
| Personnel sample - sealing gaskets | 0.51 Trace |
| Personnel sample - sealing refrigerator gaskets | 0.63 Trace |
| Personnel sample - trimming refrigerator gaskets | 0.13 Trace |
| Personnel sample - sealing dishwasher gaskets | 0.21 Trace |
| Personnel sample - granulator operator | 0.21 Trace |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #7

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC dispersion resins (B.F.Goodrich No. 128 and Ethyl No. 255) with cold mixing used to make liquid plastisol formulations for sale to subsequent processors of molded and dipped items. The charcoal trap collection method was used plus a gas chromatograph. A Mass Spec. was not used to rule out interference of other hydrocarbons. Detection levels of total hydrocarbon identified as vinyl chloride should be in the range of 0.1 to 0.2 ppm. These are time weighted average (TWA) data based on approximately two hour exposures.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Personnel sample - opening bags and mixing batches | 0.08 Trace |
| Personnel sample - working with color mixing tanks and loading mixes | 0.07 Trace |
| Personnel sample - loading drums with mixtures | 0.18 Trace |
| Personnel sample - lift-truck operator | 0.07 Trace |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #8

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC high porosity and some medium porosity resins (B.F.Goodrich No. 92 and 103EP) with hot mixing, extrusion, sealing and trimming fabricating equipment used to make gaskets for business machines and appliances. The charcoal trap collection method was used plus a gas chromatograph. A Mass Spec. was not used to rule out interference of other hydrocarbons. Detection levels of total hydrocarbon identified as vinyl chloride should be in the range of 0.1 to 0.2 ppm. These are time weighted average (TWA) data based on approximately two hour exposures.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Personnel sample - gasket extrusion area | 0.08 Trace |
| Personnel sample - gasket extrusion area | 1.25 Detectable |
| Personnel sample - operator trimming | 0.16 Trace |
| Personnel sample - business machine part area | 0.09 Trace |
| Personnel sample - gasket area | 0.14 Trace |
| Personnel sample - hopper utility | 0.06 Trace |
| Personnel sample - mixing compound | 0.12 Trace |
| Personnel sample - mixing compound | 0.12 Trace |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS EXCEPT ONE - NOTE ONE GASKET EXTRUSION AREA SLIGHTLY OVER 1.0 PPM.

Monitoring - Plant #9

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC medium porosity resins (B.F.Goodrich No. 103EP types) with hot mixing including Banbury and continuous mixer units to make small cubes of solid vinyl for sale to processors to make vinyl siding, window components, and pipe. The charcoal trap collection method was utilized plus a gas chromatograph backed up by a Mass Spec. instrument to attain detection levels of 0.05 ppm. These are time weighted average (TWA) data based on four hour exposures.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Banbury Operator | N.D. |
| CML-Henschel Mixer Operator | 0.16 Trace |
| Weigh Man (does not weigh resin) | 0.08 Trace |
| Banbury Mill Operator (strips hot batch) | 0.18 Trace |
| CML Mill Operator + cubing | 0.32 Trace |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #10

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC high porosity resin (B.F.Goodrich No. 92) with hot mixing, extrusion, sealing and forming equipment used to make flexible tubing and shapes. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. instrument and computer to attain detection levels of 0.1 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Mix Operator - mix room - charging blends | 0.5 Trace |
| Mix Operator - while mix being heated | N.D. |
| Mix Operator - during blender discharge | 0.2 Trace |
| Grinder Operator - regrind room - scrap | N.D. |
| Finishing Operator - heat sealing | N.D. |
| Extruder Operator - clearing die | N.D. |
| Tube Operator - tube cutter | N.D. |
| Fabrication - heat forming | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #11

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC rigid compound - cubes (B.F.Goodrich No. 8761) with extrusion and cut-off equipment used to make rigid vinyl pipe. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass. Spec. instrument and computer to attain detection levels of 0.1 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Grinder Operator - at saw cut-off | N.D. |
| Shift Foreman - in extrusion area | N.D. |
| Extruder Operator - near cooling tank | N.D. |
| Extruder Operator - next to puller | N.D. |
| Extruder Operator - next to die | N.D. |
| Shipping Clerk - Shipping Dept. | N.D. |
| Shipping Clerk - taken in warehouse | N.D. |
| Extruder Operator - at die | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #12

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC medium porosity resin (B.F.Goodrich No. 300X6 and Diamond Shamrock No. 450) with hot powder mixing and extrusion equipment used to make rigid vinyl house siding and accessories. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass. Spec. instrument and computer to attain detection levels of 0.1 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Extruder Operator | N.D. |
| Extruder Operator | N.D. |
| Mixer Operator - mezzanine | 0.13 Trace |
| Asst. Mixer Operator - floor level | N.D. |
| Materials handler - raw materials | N.D. |
| Grinder Operator | N.D. |
| Packer | 0.06 Trace |
| Day Worker - extrusion area | N.D. |
| Warehouse man | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

Monitoring - Plant #13

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC latex (PVC resin suspended in water - B.F.Goodrich No. 576) with spraying and fusion equipment used to make non-woven batting. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. intrument and computer to attain detection levels of 0.05 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| Spray Area Operator | 0.01 Trace |
| Take-Up Roll Operator | 0.07 Trace |
| Oven & Control Panel Operator | 0.02 Trace |
| Operator Feeding Spray Head (temporary) | 14.2 |
| Finished Product Storage Operator | 0.25 Trace |

The worker measured at 14.2 ppm was operating a make-shift supply system to the spraying operation. The normally used closed gravity feed system from a supply tank was not operating. The processor has been advised to use his closed system at all times.

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OF HIS NORMAL OPERATIONS.

Monitoring - Plant #14

Personal monitoring of workers for vinyl chloride exposure in a plant processing PVC plasticized compound - cubes (B.F.Goodrich Nos. 83715, 8865, 83700) with extrusion equipment to make flexible shapes for automotive use. A sample pump and glass collecting tubes were utilized plus a Gas Chromatograph backed up by a Mass Spec. instrument and computer to attain detection levels of 0.05 ppm.

| Workers Monitored | Vinyl Chloride - ppm |
|---|---|
| #1 Extruder Operator | 0.03 Trace |
| #2 Extruder Operator | 0.01 Trace |
| #3 Extruder Operator | N.D. |

WORKER EXPOSURE TO VC WAS WELL BELOW DETECTABLE LEVEL OF 1.0 PPM IN ALL OPERATIONS.

EXHIBIT A

28C

# VINYL CHLORIDE MONITORING

## OCCUPATIONAL EXPOSURES - NORMAL OPERATING CONDITIONS

(These personal samples represent workers' exposures under normal operating conditions. The three jobs chosen are those thought to have the highest potential exposures.)

RESULTS - PPM

| PLANT | SAMPLING WEEK | MIXER OPERATOR LAB A | MIXER OPERATOR LAB B | MIXER OPERATOR LAB C | EXTRUDER OPERATOR LAB A | EXTRUDER OPERATOR LAB B | EXTRUDER OPERATOR LAB C | MAINTENANCE M.I. LAB A | MAINTENANCE M.I. LAB B | MAINTENANCE M.I. LAB C |
|---|---|---|---|---|---|---|---|---|---|---|
| Butner | 1 | 0.2 | 0.3 | | | | 0.1 | 0.1 | | 0.1 |
| | 2 | 0.1 | | | | | | <0.1 | | |
| | 3 | 0.2 | | | | | | | | |
| Denison | 1 | 0.5 | 0.3 | | | | | | | |
| | 2 | 0.2 | | | | | | | | |
| | 3 | 0.5 | | | <0.1 | | | | | |
| Franklin | 1 | 0.6 | 0.9 | | | | | | | |
| | 2 | 0.2 | | | | | | | 0.6 | |
| | 3 | 12.0 | | | | | | | | |
| Green Cove | 1 | 0.1 | 0.1 | <0.1 | | | <0.1 | | | |
| | 2 | <0.1 | | | | | | | | |
| | 3 | | | 0.4 | | | | | | |
| Jackson | 1 | 0.8 | 1.0 | | | 20.8 | | | | |
| | 2 | 0.3 | | | | | | | | |
| | 3 | 5.8 | | | | | | | | |
| Long Beach | 1 | 0.2 | 0.5 | | 0.5 | 0.1 | | | | |
| | 2 | 0.2 | | | | | | | | |
| | 3 | 0.1 | | | | | | | | |
| Pueblo | 1 | 0.1 | 0.3 | | | | 1.3 | | 0.1 | |
| | 2 | <0.1 | | | | | | | | |
| | 3 | <0.1 | | | | | | | | |
| Stockton | 1 | 0.2 | 0.7 | | | 0.4 | 0.6 | | | |
| | 2 | 0.1 | | | 0.1 | | | 0.4 | | |
| | 3 | 0.5 | | | | | | | | |
| Tucson | 1 | <0.1 | 0.5 | | | 0.3 | 0.1 | | 0.6 | |
| | 2 | 0.6 | | | | | | | | |
| | 3 | 0.6 | | | | | | | | |
| Wilton | 1 | 0.1 | | | 0.1 | 0.1 | | | 0.1 | |
| | 2 | 0.1 | | | | | | 0.3 | | |
| | 3 | 0.5 | | | | | | | | |
| Res. & Dev. | 1 | <0.1 | | | | | | | | |
| | 2 | <0.1 | | | | | | | | |
| | 3 | | | | | | | | | |

| | | SORTER, TAKE-OFF LAB A | SORTER, TAKE-OFF LAB B | MACHINE OPER. LAB A | MACHINE OPER. LAB B |
|---|---|---|---|---|---|
| Ft. Lauderdale (Pipe Fittings) | 1 | 0.1 | 0.4 | 0.1 | 0.3 |
| | 2 | <0.1 | | <0.1 | |
| | 3 | <0.1 | | <0.1 | |

NOTE: LAB A analyses of sampling tubes included first charcoal section (100 mg) only.
LAB B analyses included both charcoal sections (150 mg).

EXHIBIT A

28C

# VINYL CHLORIDE MONITORING

## OCCUPATIONAL EXPOSURES - NORMAL OPERATING CONDITIONS

(These personal samples represent workers' exposures under normal operating conditions. The three jobs chosen are those thought to have the highest potential exposures.)

| | | RESULTS - PPM | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | MIXER OPERATOR | | | EXTRUDER OPERATOR | | | MAINTENANCE MAN | | |
| | | LAB | | | LAB | | | LAB | | |
| PLANT | SAMPLING WEEK | A | B | C | A | B | C | A | B | C |
| utner | 1 | 0.2 | 0.3 | | | | 0.1 | 0.1 | | 0.1 |
| | 2 | 0.1 | | | | | | <0.1 | | |
| | 3 | 0.2 | | | | | | | | |
| enison | 1 | 0.5 | 0.3 | | | | | | | |
| | 2 | 0.2 | | | | | | | | |
| | 3 | 0.5 | | | <0.1 | | | | | |
| ranklin | 1 | 0.6 | 0.9 | | | | | | | |
| | 2 | 0.2 | | | | | | | 0.6 | |
| | 3 | 12.0 | | | | | | | | |
| reen Cove | 1 | 0.1 | 0.1 | <0.1 | | | <0.1 | | | |
| | 2 | <0.1 | | | | | | | | |
| | 3 | | | 0.4 | | | | | | |
| kson | 1 | 0.8 | 1.0 | | | 20.8 | | | | |
| | 2 | 0.3 | | | | | | | | |
| | 3 | 5.8 | | | | | | | | |
| g Beach | 1 | 0.2 | 0.5 | | 0.5 | 0.1 | | | | |
| | 2 | 0.2 | | | | | | | | |
| | 3 | 0.1 | | | | | | | | |
| blo | 1 | 0.1 | 0.3 | | | | 1.3 | | 0.1 | |
| | 2 | <0.1 | | | | | | | | |
| | 3 | <0.1 | | | | | | | | |
| ckton | 1 | 0.2 | 0.7 | | | 0.4 | 0.6 | | | |
| | 2 | 0.1 | | | 0.1 | | | 0.4 | | |
| | 3 | 0.5 | | | | | | | | |
| cson | 1 | <0.1 | 0.5 | | | 0.3 | 0.1 | | 0.6 | |
| | 2 | 0.6 | | | | | | | | |
| | 3 | 0.6 | | | | | | | | |
| ilton | 1 | 0.1 | | | 0.1 | 0.1 | | | 0.1 | |
| | 2 | 0.1 | | | | | | 0.3 | | |
| | 3 | 0.5 | | | | | | | | |
| es. & Dev. | 1 | <0.1 | | | | | | | | |
| | 2 | <0.1 | | | | | | | | |
| | 3 | | | | | | | | | |

| | | SORTER, TAKE-OFF | | MACHINE OPER. | |
|---|---|---|---|---|---|
| | | LAB A | LAB B | LAB A | LAB B |
| . Lauderdale | 1 | 0.1 | 0.4 | 0.1 | 0.3 |
| ipe Fittings) | 2 | <0.1 | | <0.1 | |
| | 3 | <0.1 | | <0.1 | |

TE: LAB A analyses of sampling tubes included first charcoal section (100 mg) only.
LAB B analyses included both charcoal sections (150 mg).

# VINYL CHLORIDE MONITORING

## OCCUPATIONAL EXPOSURES - NORMAL OPERATING CONDITIONS

### Comments Regarding Results at or Above 1.0 PPM

**Franklin** . . . . . Mixer Operator 12.0 PPM
Nothing was observed which explains this reading. Additional sampling to be done to determine concentration variability.

**Jackson** . . . . . Mixer Operator 1.0, 5.8 PPM
Extruder Operator 20.8 PPM
Essentially all results were substantially higher at Jackson than any other plant. Resin differences are suspected. Comprehensive re-survey scheduled for week of June 24, 1974.

**Pueblo** . . . . . Extruder Operator 1.3 PPM
This sample was taken at the "belling" operator. Nothing was observed which explains this reading. Additional sampling to be done to determine concentration variability.

## VINYL CHLORIDE MONITORING

OCCUPATIONAL EXPOSURES - NORMAL OPERATING CONDITIONS
(These personal samples represent workers' exposures under normal operating conditions. The three jobs chosen are those thought to have the highest potential exposures.)

SPECIAL SAMPLING - STOCKTON PLANT

| | RESULTS - PPM | | |
|---|---|---|---|
| SAMPLE NO.* | MIXER OPERATOR | EXTRUDER OPERATOR | MAINTENANCE MAN |
| 1 | 0.5 | <0.2 | <0.2 |
| 2 | 0.3 | <0.2 | <0.2 |
| 3 | 0.8 | <0.2 | <0.2 |
| 4 | 0.7 | <0.2 | <0.2 |
| 5 | 0.6 | <0.2 | <0.2 |
| 6 | 0.7 | <0.2 | <0.2 |
| 7 | 0.8 | <0.2 | -- |
| 8 | 0.2 | <0.2 | -- |

*Number indicates sequence in which samples were taken during the normal work routine.

All analyses by Lab B.

# VINYL CHLORIDE MONITORING

OCCUPATIONAL EXPOSURES - START-UP CONDITIONS
(These personal samples represent the highest workers' exposures, under process start-up conditions which are thought to be highest.)

| PLANT | SAMPLING WEEK | RESULTS - PPM: MIXER OPERATOR LAB A | MIXER OPERATOR LAB B | MIXER OPERATOR LAB C | EXTRUDER OPERATOR LAB A | EXTRUDER OPERATOR LAB B | EXTRUDER OPERATOR LAB C | MAINTENANCE MAN LAB A | MAINTENANCE MAN LAB B | MAINTENANCE MAN LAB C |
|---|---|---|---|---|---|---|---|---|---|---|
| Bⁱtner | 1 | | | | 0.1 | 0.4 | | | | |
| | 2 | | | | 1.1 | | | | | |
| | 3 | | | | 0.1 | | | 0.2 | | |
| Dⁱnison | 1 | | | | <0.1 | 0.2 | | <0.1 | | |
| | 2 | | | | <0.1 | | | 0.1 | | |
| | 3 | | | | | | | 0.2 | | |
| Franklin | 1 | | | | 0.6 | 0.5 | | | | |
| | 2 | | | | 0.7 | | | 0.1 | | |
| | 3 | | | | 1.8 | | | 1.4 | | |
| Green Cove | 1 | | | | <0.1 | <0.1 | | | | |
| | 2 | | | | <0.1 | | | | | |
| | 3 | | | | | | 0.2 | | | |
| Jackson | 1 | | | | 16.8 | | | | | |
| | 2 | | | | 3.5 | | | 0.1 | | |
| | 3 | | | | 0.3 | | | 0.5 | | |
| Long Beach | 1 | | | | | | | | | |
| | 2 | | | | 0.3 | | | 0.1 | | |
| | 3 | | | | 0.6 | | | 0.5 | | |
| Pⁱblo | 1 | | | | 0.1 | 0.3 | | | | |
| | 2 | | | | 0.1 | | | | | |
| | 3 | | | | <0.1 | | | | | |
| Sⁱckton | 1 | | | | 1.7 | | | | | |
| | 2 | | | | | | | | | |
| | 3 | | | | 0.1 | | | 0.1 | 2.2 | |
| Tⁱcson | 1 | | | | 0.2 | | | 0.2 | | |
| | 2 | | | | 0.3 | | | | | |
| | 3 | | | | 0.6 | | | <0.1 | | |
| Wⁱlton | 1 | | | | | | | 0.1 | | |
| | 2 | | | | 0.2 | | | | | |
| | 3 | | | | 0.1 | | | 0.3 | | |
| Res. & Dev. | 1 | | | | <0.1 | | | <0.1 | | |
| | 2 | | | | <0.1 | | | <0.1 | | |
| | 3 | | | | | | | | | |

NOTE: Lab A analyses of sampling tubes included first charcoal section (100 mg) only.
Lab B analyses included both charcoal sections (150 mg).

## VINYL CHLORIDE MONITORING

### OCCUPATIONAL EXPOSURES - START-UP CONDITIONS

Comments Regarding Results at or Above 1.0 PPM

**Butner** . . . . . Extruder Operator 1.1 PPM

Nothing was observed which explains this reading. Additional sampling to be done to determine concentration variability.

**Franklin** . . . . . Extruder Operator 1.8 PPM
Maintenance Man 1.4 PPM

Nothing was observed which explains this reading. Additional sampling to be done to determine concentration variability.

**Jackson** . . . . . Extruder Operator 16.8, 3.5 PPM

Essentially all results were substantially higher at Jackson than any other plant. Resin differences are suspected. Comprehensive re-survey scheduled for week of June 24, 1974.

**Stockton** . . . . . Extruder Operator 1.7 PPM
Maintenance Man 2.2 PPM

Maintenance man cleaned vacuum pump filter while sample was taken. This operation will likely require personal protective equipment.

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# VINYL CHLORIDE MONITORING

## [illegible]NTRATIONS - NORMAL OPERATING CONDITIONS

([illegible] samples represent conditions in areas where there are no personnel. The chosen locations are those considered to have the highest vinyl chloride concentrations.)

| PLANT | SAMPLING WEEK | RESULTS - PPM: UNDER EXTRUDER DIE EXIT LAB A | LAB B | LAB C | UNDER HOT MIXER LAB A | LAB B | GRINDER ROOM GRINDING LAB A | LAB B | LAB C |
|---|---|---|---|---|---|---|---|---|---|
| Butner | 1 | 0.4 | | | 0.1 | | <0.1 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Denison | 1 | <0.1 | | | | | 0.2 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Franklin | 1 | 0.3 | | | 0.2 | | 0.2 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Green Cove | 1 | <0.1 | <0.1 | <0.1 | 0.4 | 0.1 | <0.1 | | 0.1 |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Jackson | 1 | 4.7 | 2.9 | | 1.5 | | | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Long Beach | 1 | 0.1 | <0.1 | | 4.9 | 3.3 | <0.1 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Pueblo | 1 | 0.2 | | | 0.1 | | 0.1 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Stockton | 1 | 0.8 | | | 0.5 | | <0.1 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Tucson | 1 | 0.4 | | | 0.1 | | <0.1 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Wilton | 1 | 0.1 | 0.1 | | 0.1 | | 0.1 | | |
| | 2 | | | | | | | | |
| | 3 | | | | | | | | |
| Res. & Dev. | 1 | <0.1 | | | <0.1 | | | | |

| | | #2 MOLD OUTLET LAB A | LAB B | FEED HOPPER LAB A | LAB B | SCRAP GRIND ROOM LAB A | LAB B |
|---|---|---|---|---|---|---|---|
| Ft. Lauderdale | 1 | 0.2 | | 0.8 | | 0.5 | |
| | 2 | <0.1 | | <0.1 | | 0.1 | |
| | 3 | 0.1 | | <0.1 | | 0.1 | |

NOTE: LAB A analyses of sampling tubes included first charcoal section (100 mg) only.
LAB B analyses included both charcoal sections (150 mg).

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## VINYL CHLORIDE MONITORING

## AREA CONCENTRATIONS - NORMAL OPERATING CONDITIONS

### Comments Regarding Results at or Above 1.0 PPM

Jackson.....Under Extruder Die Exit 4.7, 2.9 PPM
Under [illegible] 1.5 PPM
Essentially all results were substantially higher at Jackson than any other plant. Resin differences are suspected. Comprehensive re-survey scheduled for week of June 24, 1974.

Long Beach.....Under Hot Mixer 4.9 PPM, 3.3 PPM
This was caused by a leaking flange in the blend transfer system, which has been corrected.

VI[illegible] MONITORING

[illegible] DUST COLLECTORS

([illegible] trations in the plant, [illegible] equipment. Except for occasional maintenance there is no possible personal exposure.)

| PLANT | SAMPLING WEEK | RESULTS PPM: MAINTENANCE MAN INSPECTING COLLECTOR — LAB A | LAB B | LAB C | RESULTS PPM: CLEAN AIR SIDE COLLECTOR OPERATING — LAB A | LAB B | LAB C |
|---|---|---|---|---|---|---|---|
| Bu[illegible]her | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| De[illegible]ison | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Franklin | 1 | | | | 0.6 | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Green Cove | 1 | | | | | | |
| | 2 | 6.9 | | | | | |
| | 3 | | | | | | |
| Jackson | 1 | | | 3.3 | 15.2 | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Long Beach | 1 | 4.1 | | | 10.4 | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Pu[illegible]blo | 1 | 0.1 | | | 6.8 | | |
| | 2 | 0.1 | | | | | |
| | 3 | 0.4 | | | | | |
| St[illegible]ckton | 1 | 40.3 | | | 1.6 | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| T[illegible]son | 1 | | | | 0.6 | | |
| | 2 | 0.1 | | | | | |
| | 3 | | | | | | |
| Wi[illegible]ton | 1 | | | | 0.1 | | |
| | 2 | | | | | | |
| | 3 | | | | | | |
| Res. & Dev. | 1 | | | | | | |
| | 2 | | | | | | |
| | 3 | | | | | | |

NOTE: LAB A analyses of sampling tubes included first charcoal section (100 mg) only.
LAB B analyses included both charcoal sections (150 mg).

## VINYL CHLORIDE MONITORING

## PROCESS CONCENTRATIONS - INSIDE DUST COLLECTORS

### Comments Regarding Results at or Above 1.0 PPM

None of these results represent a regular exposure. When persons must enter these areas, appropriate work practices and protective equipment will be used.

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STATEMENT OF ANTHONY MAZZOCCHI
CITIZENSHIP-LEGISLATIVE DIRECTOR
OIL, CHEMICAL AND ATOMIC WORKERS INTERNATIONAL UNION
ACCOMPANIED BY STEVEN WODKA, LEGISLATIVE ASSISTANT
ON
PROPOSED PERMANENT STANDARD ON VINYL CHLORIDE
BEFORE
U. S. DEPARTMENT OF LABOR
WITH AN ACCOMPANYING STATEMENT BY
SANFORD BECK, PRESIDENT, OCAW LOCAL NO. 3-727

July 9, 1974

It is not our purpose here today to offer repetitive testimony. OCAW is a member of the Industrial Union Department, AFL-CIO, and the testimony offered by Peter Bommarito, President, URW, and Chairman, IUD Committee on Health and Safety and Louis Beliczky, URW, is fully endorsed by our Union.

However, our Union would like to underscore President Bommarito's testimony on blackmail.

Industry has consistantly characterized those who have attempted to develop information and public dialogue on industrial hazards as engaging in scare tactics. These hearings have been the occasion for the mobilization on the part of industry of every conceivable manufacturer and user of PVC for the purpose of engaging in massive scare tactics of "your job or your life."

The Occupational Safety and Health Act of 1970 declares its responsibility "to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources."

The preservation of human resources is what concerns the trade union movement and the Oil, Chemical and Atomic Workers International Union has made this effort one of its main thrusts.

It certainly is not our purpose or is it that of our fellow-trade unionists to destroy the economic base of our existence - that being the jobs of our dues paying union membership. Our purpose here today is to urge the adoption, with some minor alteration, of the reasonable proposed permanent standard on vinyl chloride.

Anything less would be to continue the subsidy being given by American workers of years of their lives to produce vinyl chloride.

OCAW is extremely concerned about the vinyl chloride problem. Data has been developed by Dr. Irving Selikoff of Mount Sinai School of Medicine through examinations of

the membership of Local 8-277, who are employees of the Goodyear Tire and Rubber Company in Niagara Falls, New York.

Dr. Selikoff's medical team found a significant prevalence of liver abnormalities, peripheral vascular changes, and lung abnormalities. Acroosteolysis was also found. The Mount Sinai mortality study also found an excessive number of deaths, an excessive amount of cancer, and as well as twenty percent of the U. S. reported industrial angiosarcomas among this group. These data indicate to us that a serious problem exists and is in need of serious immediate attention.

What further disturbs us is that the problem of vinyl chloride abnormalities was known to some elements of the scientific-medical-industrial community for some years -- but it was not until the Goodrich episode did people who work with the substance and their designated representatives were made aware of the problem.

It may be helpful, as we are testifying in the latter half of this hearing, to put some of the testimony thus far into perspecitve.

The vinyl chloride insustry is divided into three parts: monomer production, polymerization, and fabrication. The OCAW represents thousands of workers among all three parts. Industry testimony has indicated that each segment has its particular problems.

Industry has proposed that the fabrication segment essentially be exempted from the proposed standard. We oppose this. The testimony of Robintech, Goodyear, Diamond Shamrock, Goodrich and others as well as NIOSH indicate that there is detectable exposure among some stages of the fabrication process. However, there is general agreement that known engineering solutions such as ventilation and reduction of the residual monomer in the polymer will reduce exposure to the nondetectable level. We encourage all efforts in this direction. However, these improvements would not have come about had fabrication plants not been included under the emergency temporary standard and the proposed permanent standard.

We therefore request that fabrication firms be covered under the permanent standard so that 1) the reduction of vinyl chloride exposure is maintained and 2) those employees who have already been overexposed will receive the benefits of OSHA's requirements for medical examinations and recordkeeping.

On the other side of the industry, the monomer plants will also have little difficulty reaching the nondetectable level. For example, Dow Chemical has indicated that its plants can already meet such a level. Vinyl chloride monomer is produced in a closed system out-of-doors,

which is usually part of a larger petrochemical facility. Exposure to vinyl chloride usually occurs from leaking equipment, tank car loading and unloading, quality control sampling, and during maintenance operations. When performing the latter three, workers can be protected by improved procedures and the use of personal protective equipment.

However, the chronic exposure from leaking equipment can be controlled by better engineering and, most importantly, proper and timely preventive maintenance before leaks occur. For ye[illegible] we have protested the petrochemical industry's policy of the "calculated risk." Here, equipment is run whithout shutdown for maintenance until it literally falls apart. While this policy has proven profitable in the past for the petrochemical industry, the cost was paid by the numbers of deaths and injuries among our members. It is our hope that the proposed permanent standard would force the industry into a proper preventive maintenance program which will reduce exposure to vinyl chloride to the non-detectable level.

Lastly, we come to the polymerization industry. We have yet to see conclusive evidence that there are plants that cannot meet the nondetectable level by October, 1974. In fact, we do not think that the industry has been fully candid with OSHA on this point during these hearings.

For example, we have reviewed the monitoring data for vinyl chloride that has been supplied to our Local 8-277 in Niagara Falls, New York, by the Goodyear Tire and Rubber Company. This is the type of polymerization plant that the Society for the Plastics Industry would have us believe is going to have the hardest time meeting the standard. The Niagara Falls plant is old (1946), has small reactors and is an enclosed plant.

However, this plant already comes very close to meeting SPI's proposed standard for 1976. The average concentration on all three shifts from May 21 to May 28, 1974 was 11 ppm. This count, by the way, was of total hydrocarbons, therefore, actual vinyl chloride would be less than 11 ppm. As you recall, SPI proposed a 10 ppm TWA for 1976.

The data for that period also indicates that there were excursions. One went as high as 10,000 ppm and a building had to be evacuated for 30 minutes. However, our Local Union informs us that additional engineering improvements and increased familiarity with new operating procedures has caused July's average exposures to drop below those of May.

Our purpose in bringing this up is to indicate 1) the need for closer scrutiny of industry claims that a nondetectable is unfeasible and 2) the need for OSHA to adopt a

nondetectable exposure limit for October, 1974 so that those plants than can meet this level, will be required to meet it.

It will be a tragedy if OSHA adopts the so-called "common denominator" kind of standard that the SPI has proposed. Under this approach, a standard is adopted that everybody can meet. But those plants that can go further are under no incentive at that time to do anything more.

Instead, if a nondetectable standard is effective for October, 1974, many more workers will reap its increased protections and safety.

For those plants which can not genuinely meet a nondetectable level, the variance procedures of the Occupational Safety and Health Act should be utilized.

Congress showed great foresight when writing this provision of the Act. It was meant to apply in situations as with vinyl chloride when some plants may not be able to meet a certain standard. Under the variance rules, employees must be protected by alternate means which are "as safe and healthful" as the standard. These alternate methods may not be the most desirable nor the most efficient, but the amount of protection is equal. Furthermore, employees rights are protected with the right to a hearing and the opportunity for participation. Anything less from OSHA will spell death and disease to thousands of workers who otherwise could have been protected.

There are some specific improvements that we recommend for the proposed permanent standard that merit special mention.

I. Section (0) Medical Surveillance

(1) Part(8)- This provision provides for the removal from exposure to vinyl chloride of a worker whose liver function abnormalities are liver disease related. It should be made clear in the standard that such an affected worker retains his employment, seniority, and rate of pay.

(2) We endorse the recommendations of Dr. Irving Selikoff for medical surveillance into the post-employment period of a worker's life.

(3) Part (9)- Accordingly, medical records should be kept for the worker's lifetime.

II. Section (P) Records

(1) Part (5) - It should be added that an aggregate report (respecting confidentiality) on all medical surveillance should be made available to the employees and their designated representatives. Further, it should be added that an employee may request that a physician designated by his union be sent his full medical records.

(2) Part (2) - We commend OSHA's proposal that records be transmitted to NIOSH.

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III. Section (q) Reports

All reports, particularly incident reports sent to OSHA, should be provided by the employer to his employees and their designated representatives.

IV. Section (g) Respiratory Protection

Any time respiratory protection is required, provision must be made for fatigue caused by these devices. We recommend rotation of personnel and/or rest periods.

In preparation for our testimony, we reviewed the record of the OSHA standards hearing on asbestos in 1971. We found striking similarities in regards to the question of feasibility between that record and what we have heard in this hearing thus far.

Almost the same phrases were used then. It was said that the proposed standard:

"would cripple the industry,"
"is not economically feasible,"
and "cannot be achieved by any known engineering methods."

None of these dire predictions came true because none were based on fact. Instead, these were threats and scare tactics used by the asbestos industry to hound the Labor Department into adopting a weaker standard.

Today, the plastics industry knows that they have an occupational health problem. The only question in their minds is how long can they put off dealing with the problem and how can the total expenditure of funds be minimized. Thus the tactic they have used is to call a standard unfeasible and to forecast economic disaster and widespread unemployment. It is our hope that OSHA will not succumb to these pressures.

EXHIBIT 9-3

IN THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

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No. 74-1268

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POLYURETHANE MANUFACTURERS
ASSOCIATION,

Petitioner,

v.

DEPARTMENT OF LABOR, et al.,

Respondents.

---

On Petition for Review of Standard
Issued By Assistant Secretary of
Labor for Occupational Safety and
Health

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# BRIEF OF OIL, CHEMICAL AND ATOMIC WORKERS INTERNATIONAL UNION, AFL-CIO AND HEALTH RESEARCH GROUP (PETITIONERS IN NO. 74-1149) RELATING TO THE REGULATION OF 4,4'-METHYLENE BIS(2-CHLOROANILINE) IN NO. 74-1268

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In No. 74-1149

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IN THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

| | | |
|---|---|---|
| POLYURETHANE MANUFACTURERS ASSOCIATION, | ) | |
| Petitioners, | ) | |
| v. | ) | No. 74-1268 |
| DEPARTMENT OF LABOR, et al., | ) | |
| Respondents. | ) | |

BRIEF OF OIL, CHEMICAL AND ATOMIC WORKERS INTERNATIONAL UNION, AFL-CIO AND HEALTH RESEARCH GROUP (PETITIONERS IN NO. 74-1149) RELATING TO THE REGULATION OF 4,4'-METHYLENE BIS(2-CHLOROANILINE) IN NO. 74-1268

This brief is submitted in support of the Secretary's determination under section 6(b) of the Occupational Safety and Health Act[1] that 4,4'-methylene bis(2-chloroaniline)("MOCA") is a carcinogen. The issue of MOCA's carcinogenicity may be divided into two parts. First, whether the Secretary's decision to rely on experimental evidence in determining the cancer hazard of worker exposure is based on sound scientific judgment, considering the necessity of using experimental evidence as the best available evidence and the irreversible consequences of continued human exposure. This argument is set out in Point I of our brief dated May 2, 1974 with

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[1] 29 U.S.C. § 655(b)

respect to the carcinogenicity of ethyleneimine (EI) -- a chemical under consideration in consolidated case No. 74-1129. That argument, including a discussion of the substantial evidence standard of review, is incorporated by reference herein. Point I of this brief will be directed to the second part -- the specific carcinogenicity of MOCA. Finally the Polyurethane Manufacturers' Association ("PMA") alleges a number of procedural irregularities in the issuance of the permanent standard, and these will be dealt with in the second part of this brief. Because we do not have any serious difference with the statement of the case relevant to this brief, we will proceed directly to our argument.

I. RESPONDENTS' FINDING THAT MOCA IS CARCINOGENIC IS SUPPORTED BY SUBSTANTIAL EVIDENCE

PMA admits that MOCA has caused tumors in experimental rats and mice, Labor Dept. Public Hearing on Carcinogens, September 12, 1973 (JA 1279-1280), but argues that MOCA has not been shown to cause cancer in workers who had been exposed to the chemical in the mid-1950's when manufacture of MOCA began (Br. 38). The petitioner fails to mention that, in the study it relies on, conducted by DuPont which manufactures MOCA, only 20 workers out of 178 covered were first exposed to MOCA at least 15 years prior to the report, NIOSH, Hazard Review (JA 4240-4241). Since the average latency period for development of cancer after first exposure to a carcinogen

can extend to well over 20 years, that period has not yet expired for any of the workers studied, and therefore no significant conclusions as to carcinogenicity of MOCA can be based on such a limited study of worker exposure.[2]

The PMA also contends that workers at Firestone, Union Carbide, Monsanto, and the Atomic Energy Commission have not experienced any harmful effects after exposure to MOCA (Br. 39). In fact, none of these employers has extensively studied its workers, nor presented detailed information to OSHA on experiences in their plants. There is no meaningful description of Firestone's "health monitoring program" in comments submitted to OSHA (JA 4245). The Union Carbide and Monsanto representatives testifying at the Standards Advisory Committee on Carcinogens did not even know exactly when their workers were first exposed to MOCA (JA 2990, 3009). Moreover, the Monsanto representative "had a feeling it's in the neighborhood of 12 years" (JA 2990) -- obviously much too soon to reach any conclusions on carcinogenicity. Finally, the AEC facility using MOCA does not maintain any type of tumor registry for exposed

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[2] Even the DuPont Company which conducted the study has stated in its own "Bulletin #3C" that

> it is recognized that neither the group size nor the time period are large enough to permit a significant conclusion.

Standards Advisory Committee on Carcinogens, July 25, 1973 (JA 2937)

employees (JA 3011). On the basis of this data, OSHA appropriately concluded that the studies of workers exposed to MOCA "were not definitive and cannot be relied upon to assess the hazards of exposure"(JA 845).

In the absence of definitive human data, one must look to animal evidence on which to base a conclusion as to carcinogenicity. In the case of MOCA, at least three independent investigations have demonstrated that the chemical causes cancer in experimental animals:

(1) German investigators found that 43 out of 50 rats fed MOCA for 1½ years developed tumors (lung, liver, and mammary carcinomas), Steinhoff, D. and E. Grundmann, Naturwissenschaften 58:578, 1971, cited in NIOSH, Hazard Review (JA 4236-4237);

(2) a 1971 study by DuPont investigators demonstrated lung and liver tumors after ingestion of MOCA by rats; Stula, E.F. et al., Toxicology and Applied Pharmacology. 19:380, 1971 (preprint in JA 349), cited in NIOSH, Hazard Review (JA 4235); and

(3) a recent study by National Cancer Institute scientists reported the development of a wide variety of tumors (including vascular, bladder and lung tumors ) in exposed rats and mice; Russfield, A.B., et al., submitted to

Toxicology and Applied Pharmacology, cited in NIOSH, Hazard Review (JA 4238-4239).

Thus, there exists a substantial body of scientific evidence demonstrating that MOCA is a carcinogen. The fact that a seven year study on dogs has to date failed to demonstrate carcinogenicity in that species (Br. 41, n. 22; JA 983) in no way negates the conclusion of carcinogenicity. The record shows that this particular study involves only six dogs exposed to MOCA at approximately 1/100th of the dose given to experimental rats, Standards Advisory Committee on Carcinogens, July 25, 1973, (JA 2950-2951), hardly a meaningful comparison.[3]

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[3] According to Dr. John Zapp of the DuPont Company, the tests on these six dogs were still under way at DuPont labs at the time of the Advisory Committee meetings in July.

> "Dr. Epstein: Could you give us some idea what was the dosage in the dog study? I gather six dogs were tested.
>
> "Dr. Zapp: Yes. They're still being tested. That was a dose of 100 milligrams per day, which translates to about 10 milligrams per kilo per day.
>
> . . .
>
> "Dr. Epstein: . . . One is giving a very low dosage to the dog, namely, one hundredth less than that given to the rat. The question is whether the experiment will prove anything based on six with testing at very low, low levels, whether it constitutes a valid basis for drawing inferences as to carcinogens or otherwise.
>
> "Dr. Zapp: I haven't drawn any inferences yet from the dogs."

(JA 2950-2952).

Thus, from the above analysis it is clear that the conclusion classifying MOCA as a carcinogen is supported by the studies cited by respondents and the scientific review conducted by NIOSH. This proof provides substantial evidence for respondents' determination as required by section 6(f) of the Act, and nothing in the criticisms or the inadequate or incomplete studies offered by PMA undermines the conclusion that MOCA is a carcinogen.

## II. THE ALLEGED IRREGULARITIES IN THE RULEMAKING PROCEDURES DO NOT INVALIDATE THE PERMANENT STANDARD ON MOCA

The principal point made by the PMA in its brief is that the rulemaking process did not comply with the requirements of the Act, and hence the standard must be set aside. PMA's objections are presented in a series of scattergun attacks on the conduct of the respondents in handling what is conceded by all to be a very involved set of problems relating to fourteen occupational carcinogens. PMA's contentions with respect to alleged procedural irregularities are invalid for two basic reasons: the brief alleges errors, but fails to make any showing of prejudice resulting from them, and the errors alleged are based on misunderstandings of the applicable law.

### A. Requirement of Prejudicial Harm

In a recent case involving the validity of an occupational safety standard, the Seventh Circuit pointed out that the petitioner

must do more than claim prejudice arising from technical violations of the statute. National Roofing Contractors Association v. Brennan, ____F. 2d____, No. 73-1082 (April 30, 1974)(Slip Opin. at 3-4). A petitioner is not "ipso facto prejudiced" by every minor deviation from the statute, and in order to obtain a reversal, "specific prejudice" must be shown. Id. at 4 . Thus,the petitioner must make a clear connection between its claimed error and prejudice to its position, a showing which was not made here.

1. The Emergency Temporary Standard

PMA baldly asserts that the emergency temporary standard was improperly issued and that this issuance "substantially prejudiced the objective development of the permanent standard"(Br.25). Quite apart from the question of whether, because an appeal of any standard must be taken within sixty days from its issuance, the challenge of the emergency standard is untimely[4], the allegation of prejudice

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[4] See section 6(f) of the Act, 29 U.S.C. § 655(f). The case of Associated Industries of New York, Inc. v. Department of Labor, 487 F. 2d 342, 349 (2nd Cir. 1973), is relevant on this point since there the Government attempted to restrict review of a new permanent standard on the petitioners failure to seek review of the original permanent standard issued two years previously. The Court held that this failure to seek review could not foreclose a subsequent attack on a new standard, Id. at 350-351. The Court however did not reopen consideration of the orginal standard. In the instant case, the petitioners are equally foreclosed from review of the emergency temporary standard except insofar as those regulatory issues recur in the permanent standard.

is simply never supported. The brief asserts (p. 26) that issuance of the emergency temporary standard improperly started the procedural clock in motion which led to the issuance of the current erroneous standard, but does no more to support the claim of substantial prejudice.[5] It is apparent that PMA's claim is without merit in any event since this Court is fully empowered to review the permanent standard for all errors.[6]

2. Failure to Separately Consider and Regulate MOCA

PMA argues that it was error to include all fourteen carcinogens in one rulemaking proceeding (Br. 32-33), but again does not explain how this adversely affected the determination with respect to MOCA or the effective participation of the PMA. It is, of course, well settled that an administrative agency has wide discretion in the control of its docket,[7] and there is nothing to indicate an

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5 Even the claimed error in the prior proceeding -- failure to notify PMA that MOCA might be subject to an emergency standard -- is insufficient as a matter of law since section 6(c) of the Act, 29 U.S.C. § 655(c), has no such notification requirement in it.

6 PMA's other basic argument is that the Secretary was not reacting to a "fast breaking situation", Florida Peach Growers Association v. Department of Labor, 489 F. 2d 120, 127 (5th Cir. 1974). But cf. Dry Color Manufacturers' Asscciation v. Department of Labor 486 F. 2d 98, 108 & n. 15 (3d. Cir. 1973). This issue, however, is uniquely related to whether the Secretary has satisfied the criteria for the issuance of an emergency temporary standard, 29 U.S.C. § 655(c) -- an issue which is most appropriately considered during review of the emergency temporary standard and not a permanent standard where an entirely different statutory criteria applies, 29 U.S.C. § 655(b)(5).

7 City of San Antonio v. CAB, 374 F. 2d 326, 329 (D.C. Cir. 1967)

abuse of that discretion here. This is reinforced by the single hazard presented by these chemicals, their carcinogenicity. PMA's assertion to the contrary does not prove it. Finally, the PMA does not point to a single incident where it was denied the opportunity to participate in the rulemaking proceedings -- its communications with the Department of Labor (JA 935; Br. 31, n. 18; also Affidavit of E. Murphy, Petitioner's Motion for Stay, App. 3, para. 5), the issuance of an interim variance order (JA 4252), an appearance before the Standards Advisory Committee on Carcinogens (JA 3016) and its testimony at the public hearings (Exh. #218; JA 1252), all demonstrate both the opportunity to participate and PMA's utilization of it. The end result of this participation was the capitulation of the Secretary to PMA's objection to a unified standard for the fourteen carcinogens when the Secretary issued a separate standard for each carcinogen, including MOCA, 29 C.F.R. § 1910.93e (JA 853).

B. There Were No Deviations From Statutory Requirements

1. The Development of Criteria By NIOSH

PMA contends that the failure of NIOSH to develop criteria with respect to MOCA invalidates the permanent standard issued by the Secretary of Labor (Br. 22-23). First, it must be pointed out that NOISH is a division of the Department of Health, Education and Welfare -- it is not an internal office within the Department of

Labor accountable to the Secretary of Labor, 29 U.S.C. § 669. The responsibilities of the Secretary of HEW and the Director of NIOSH are not tied to the standard-setting procedure. Rather, they are involved generally in consultations with the Secretary of Labor on the development of specific plans for research, demonstrations, and experiments preliminary to the production of criteria, 29 U.S.C. § 669(a)(2), and the actual development of criteria based on research, demonstrations, experiments, and other information available to the Secretary of HEW, 29 U.S.C. § 669(a)(3). See also 29 U.S.C. § 671(c); S. Rep. No. 91-1282, 91st Cong. 2d Sess. 19-21, 38-39(1970).

In contrast, the authority to establish specific occupational safety and health standards is independently delegated to the Secretary of Labor, 29 U.S.C. § 655, who is free to rely on a variety of sources for establishing standards, 29 U.S.C. §§ 655(a), 655(b). The exercise of the Secretary of Labor's discretion is limited by a number of specific requirements, 29 U.S.C. §§ 655(b), 655(c), but obtaining criteria or recommendations from NIOSH is not one of them.[8] Notably, the only official group which must submit its recommendations to the Secretary of Labor is an appointed advisory

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[8] This is consistent with the decision of the Court of Appeals for the District of Columbia Circuit which recently recognized that NOISH recommendations are entitled to careful consideration, but are not dispositive, Industrial Union Department, AFL-CIO v. Hodgson, ____F. 2d____, No. 72-1713 (D.C. Cir. April 15, 1974)(Slip Opin. at 18).

committee, 29 U.S.C. § 655(b)(1). The failure of NIOSH to transmit a formal criteria document or recommendations and the failure of the Labor Department to offer an explanation (Br. 23) are not in violation of the Act and therefore not a basis for vacating the permanent standard. Moreover, while NIOSH recommendations have not been incorporated into a complete criteria document, the record contains extensive NIOSH presentations of full scientific literature reviews for each of the fourteen chemicals (JA 942, 3635, 3805, 4234, 4614-4718), a recommendation for a use permit system(JA 84-85), and the testimony of the Director accompanied by select members of his staff at the public hearings (JA 1562). The participation of NOISH in these rulemaking proceedings has been significant regardless of the absence of a formal criteria document, and PMA has not shown that any legal right accruing to it under the Act has been transgressed.

2. Advisory Committee Composition

PMA alleges that none of the committee members had ". . .experience or practical knowledge concerning the use of MOCA in production processes. . ."(Br. 30), and no member was capable of representing those employers who use the substance (Br. 31). A similar contention was raised in National Roofing Contractors Association v. Brennan, supra at 3 , where the petitioners alleged that "...no roofing industry member was appointed and that the

general contractors on the committee did not adequately represent them." The court first noted that the interests of the roofing contractors and the general contractors were plainly the same, and then held that the petitioners had failed to show specific prejudice, Id. Here the PMA was directly represented by one of its own members, DuPont (Br. 2), who not only has an identity of economic interest as a major producer of MOCA but whose recommendations for safe use are suggested by PMA as a model procedure which should have been adopted as the permanent standard. The support given these recommendations is emphasized by the PMA's reference to the "experience and research" on which DuPont's recommendations are based (Br. 50). Moreover, small users of MOCA were provided an opportunity through their committee member to appear before the advisory committee (JA 3016). If there is any inability of PMA member-DuPont to adequately represent the interests of MOCA users, it is certainly not attributable to the Secretary.

3. Other Allegations

Finally, PMA suggests a number of procedural irregularities relating to the sequence in which events were supposed to have taken place but did not, and to the timing between events (Br. 33-35). These contentions are without merit because of PMA's failure to recognize that the procedure outlined in section 6(b) of the Act, 29 U.S.C. § 655(b), must be accomodated within the compressed time

frame which follows the issuance of an emergency temporary standard, see Dry Color Manufacturers' Association v. Department of Labor, 486 F. 2d 98, 107-108 (3d Cir. 1973) (accomodation of National Environmental Policy Act). Moreover, PMA reads into the statute a requirement that every time the respondents intend to vary in any respect from a prior proposal, notice and opportunity must be afforded, even if the change amends the proposal in conformity with that party's prior objections. In short, there is nothing in the Act that supports the claims of PMA as to such procedural irregularities, let alone is there sufficient prejudicial error based on them to set the standard aside.

## CONCLUSION

For the reasons set forth above, the Secretary's determination that 4,4'-methylene bis(2-chloroaniline) is a carcinogen should be upheld by this Court.

Respectfully submitted,

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*The extensive assistance of Andrea M. Hricko is gratefully acknowledged.

EXHIBIT G-4 394

IN THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

No. 74-1129

SYNTHETIC ORGANIC CHEMICAL
MANUFACTURERS ASSOCIATION, et al.,

Petitioners,

v.

PETER J. BRENNAN, Secretary,
Department of Labor, et al.,

Respondents.

ON PETITION FOR REVIEW OF STANDARD
ISSUED BY ASSISTANT SECRETARY OF LABOR FOR
OCCUPATIONAL SAFETY AND HEALTH

# BRIEF OF OIL, CHEMICAL AND ATOMIC WORKERS INTERNATIONAL UNION, AFL-CIO AND HEALTH RESEARCH GROUP (PETITIONERS IN NO. 74-1149) RELATING TO THE REGULATION OF 3,3'-DICHLOROBENZIDINE AND CHLOROMETHYL METHYL ETHER IN NO. 74-1129

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IN THE UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

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| SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION, et al., | ) |
| Petitioners, | ) |
| v. | ) No. 74-1129 |
| PETER J. BRENNAN, Secretary, Department of Labor, et al., | ) |
| Respondents. | ) |

BRIEF OF OIL, CHEMICAL AND ATOMIC WORKERS INTERNATIONAL UNION, AFL-CIO AND HEALTH RESEARCH GROUP (PETITIONERS IN NO. 74-1149) RELATING TO THE REGULATION OF 3,3'-DICHLOROBENZIDINE AND CHLOROMETHYL METHYL ETHER IN NO. 74-1129

This brief is submitted in support of the Secretary's determinations under section 6(b) of the Occupational Safety and Health Act[1] that 3,3'-dichlorobenzidine ("DCB") and chloromethyl methyl ether ("CMME") are carcinogens. The issue of the carcinogenicity of DCB and CMME may be divided into two parts. First, the Secretary's decision to rely on experimental evidence in determining the cancer hazard of worker exposure is based on sound scientific judgment considering the necessity of using experimental evidence as the best available evidence, and the irreversible consequences

[1] 29 U.S.C. § 655(b).

of continued human exposure. This argument is set out in Part I of our brief with respect to the carcinogenicity of ethyleneimine (EI)--another chemical included in this petition for review (No. 74-1129)--and is incorporated by reference herein. This brief will be directed to the second issue--the specific carcinogenicity of DCB and CMME. Because we do not have any serious difference of the statement of the case relevant to this brief, we will proceed directly to our argument.

## I. RESPONDENTS' FINDING THAT DCB IS CARCINOGENIC IS SUPPORTED BY SUBSTANTIAL EVIDENCE.

The carcinogenicity of DCB has been experimentally confirmed in hamster, rat, and mouse studies. In a 1969 study, bladder, liver, and bile duct tumors were produced in hamsters fed the chemical at a dose of 0.3% in their diet, Sellakumar et al., Aromatic Amines Carcinogenicity in Hamsters (JA 402). The Russian scientist Pliss had earlier found a variety of tumors, including (among others) bladder, liver, small intestine, mammary, and sebaceous glands, in rodents fed or injected with DCB, NIOSH, Hazard Review (JA 3637-3639). Of 111 rats exposed to DCB in one study, 4 lived until the appearance of the first tumor and 30 of those (47%) developed tumors by the time of the initial report on this experiment, Pliss, Experimental Tumors Induced in Rats by Dichlorobenzidine (JA 279). Later reports on the same experiment showed that 48 of the 64 rats

(75%) ultimately developed tumors, Pliss, The Blastomogenic Action of Dichlorobenzidine, Vop. Onkol. 5: 524-533 (1959) (cited in JA 359). No tumors were found in 130 control rats, Id.

In another study, Pliss reported 12 liver tumors and some injection site sarcomas in 163 mice fed and injected DCB, Experimental Studies on Carcinogenic Effect of Certain Aromatic Amines: Blastomogenic Action of Dichlorobenzidine (JA 397-399). Finally, in a 1971 American study, scientists found malignant mammary and skin tumors in rats that ingested DCB as part of their diet for about one year, Stula et al., Experimental Neoplasia in Rats from Oral Administration of 3,3'Dichlorobenzidine, 4,4' Methylene-bis (2-Chloroaniline) and 4,4'-Methylene-bis (2-Methylaniline) (JA 353). Five times as many hematopoietic tumors (i.e., in blood-forming organs) were found in male rats that ingested DCB than in the control rats in that study (JA 354, 367, Text-Figure 1).

Thus, the carcinogenicity of DCB has been amply demonstrated in a wide variety of organ systems in three species of experimental animals. Industry-petitioners do not dispute the experimental evidence that tumors have been produced in animals after administration of DCB. Rather, they contend that the scientific studies showing positive results of carcinogenicity for DCB are flawed because of differences between man and experimental animals in the

way that DCB is metabolized, thereby invalidating any extrapolation from the experimental rats and mice to humans (Br. 7, 35-36).

The industry-petitioners argue that the scientific evidence indicates that DCB should not cause bladder cancer in man because man does not metabolize DCB (Br. 7, 42-43). They arrive at this conclusion in the following manner:

(1) DCB is an aromatic amine (Br. 43);

(2) the metabolites of other aromatic amines (such as benzidine) rather than the chemicals themselves are responsible for causing bladder cancer (Br. 42-43);

(3) although the rat metabolizes DCB, the process is different in the human body, and therefore rat experiments showing carcinogenicity are not relevant in considering the risk of human bladder cancer from DCB (Br. 7, 36);

(4) DCB does not metabolize in the body of dogs, which have a metabolic system similar to man, but is instead excreted in the feces as unchanged DCB (Br. 43-44).[2] This type of excretion distinguishes DCB from other aromatic amines that are known to cause bladder cancer, since these other chemicals are excreted in

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[2]Some of the evidence introduced by industry-petitioners on the failure of DCB to metabolize is contradictory. Troll, for example, detected two unidentified metabolites of DCB in the urine of dogs exposed to the chemical (JA 3751). Industry-petitioners admit that a small amount of a DCB metabolite was also found in monkey urine after administration of DCB (Br. 48) and that humans are somewhat close to monkeys in their metabolic pathways (JA 3706). Moreover, one industry witness testified that metabolites of DCB have not actually been looked for in the urine of workers exposed to the chemical, Standards Advisory Committee on Carcinogens, August 8, 1973 (TR. 54-55).

the urine as metabolites rather than as chemicals in their original form (Br. 43-44, JA 327-328); and

(5) on the basis of dog studies, DCB most likely does not metabolize in the human body, and it is therefore unlikely that DCB would cause cancer of the bladder [the "suspected target organ" (Br. 38)] in man (Br. 7, 44 & n.1, 42-43, 50).

The industry-petitioners' argument about the potential of DCB as a human bladder carcinogen suffers from three serious oversights. First, the chemical DCB itself, rather than its metabolites, may be the carcinogenic agent, as industry-petitioners admit is the case with certain other chemicals (Br. 41-42).[3] Since their claim relates solely to differences between human and animal metabolism of DCB, it does not dispose of the possibility that DCB itself rather than its metabolites may cause cancer. Second, not all of the DCB administered to dogs and monkeys (whose metabolic system is somewhat similar to man's) was found to be eliminated from the body of test animals, and the fate of the DCB remaining in the body is unknown. For example, in one study cited by the industry-petitioners, 10% of the DCB was found

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[3] Certain aromatic amines, e.g., benzidine, are biochemically activated in the body and are transformed to "metabolites." They concentrate in the urine and act directly on the bladder lining. Other carcinogens enter the body, travel through the gastroinestinal tract, and are excreted in the feces. Some carcinogens may migrate to particular organs (e.g., skin, liver, bone) where they may be stored. Cancer generally occurs at the site in the body where the action of the carcinogen is most prolonged, Encyclopedia of Occupational Health and Safety (1971) 187-188, 241, 257 (Exh. #268, 269).

in the liver, spleen, and carcass of experimental dogs 24 hours after injection of DCB, Meigs et al., Biotransformation of the Benzidines (JA 327-328).[4] The potential for the unaltered DCB itself to cause cancer in these or other body organs to which it may migrate was not assessed by the study's authors, nor by the industry-petitioners.

Third, and by far the most important point, the bladder may not be the primary target for DCB's carcinogenic action in man.[5] In fact, what is most striking about the experimental evidence is the diversity of target organs affected by the chemical. No one organ (and certainly not the bladder) stands out as the primary site affected by exposure to DCB. Thus, whether DCB metabolizes in the human body (thereby resulting in longer contact with the bladder lining) is only part of the question addressed by the respondents in considering the potential of DCB to cause cancer in workers exposed to it. One must look to a host of organs other than the bladder that might potentially be affected in man, such as the

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[4]In another study, heavily relied on by industry-petitioners (Br. 47-49), between 2-4% of the DCB injected into dogs was not eliminated from the animal's body within 7 days after injection of the chemical (Br. 47), Kellner et al., Animal Studies on the Kinetics of Benzidine and 3,3'-Dichlorobenzidine (JA 4935).

[5]For example, Hueper states that recognized sites of cancer caused by aromatic amines are the bladder, ureter, and renal pelvis; suspected sites are the intestine, lung, liver and prostate, Legal Medical Cyclopedia § 38.46d (Exh. #135).

liver, skin, blood and mammary glands--in which tumors had developed experimentally after administration of DCB.[6]

In light of the experimental evidence, the sole focus of the industry-petitioners on bladder cancer in evaluating the "epidemiological" data on exposure of workers to DCB, seems totally unwarranted, if not misleading. Their tunnel vision with respect to bladder cancer led them to erroneously dismiss other types of cancer actually found in the workers studied as not attributed to DCB exposure. (Br. 49, 53-54) (JA 3740-3741, 3778).

To support their own claim of non-carcinogenicity, the industry-petitioners rely primarily on a study conducted for the Allied Chemical Company--one of the petitioners--by Dr. Horace Gerarde, Industrial Experience with 3,3'-Dichlorobenzidine--an Epidemiological Study of a Chemical Manufacturing Plant (JA 3729). Leaving until later a discussion of the major flaws in the study's methodology,[7] an examination of the results relied upon by the employers establishes that they give no comfort to workers exposed to DCB. Although none of the 207 workers followed was found to have bladder cancer, 17 of them developed other kinds of tumors (JA 3778,

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[6]W. Hueper, Environmental and Occupational Cancers of the Urinary System 140-141 (1969), cited in Petition for Emergency Standard (JA 15).

[7]See pp. 9-10, infra.

Finally, since the industry petitioners rely so heavily on the Gerarde study to support their conclusion that DCB does not cause cancer in man (Br. 52-55), some general observations on the study's methodology are in order.[10] First, the study utilizes data from a very small sample of exposed workers. Although 207 DCB-exposed workers are included in the study, only 101 of them have had even 20 years elapse since their first exposure to DCB, and not one of the workers has yet experienced the full latency period of 40 years (JA 3741).[11] Moreover, 19 of the men have had no follow-up for over 15 years, id.; the authors apparently do not know if they are alive or dead, let alone whether any of them has cancer or has died from it. And there is even incomplete data on six of the dead workers (JA 3790, Table 18).

Second, the quality and accuracy of the study must be severely questioned because it contains figures on the numbers of employee deaths that are at extreme and unexplained variance with figures cited earlier by the industry-petitioners for this same population (JA 4144; Affidavit of Max Saltzman, JA 3660). See also Brief for

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[10]Detailed criticism of the Gerarde study was submitted to the Department of Labor following the Public Hearing and is a part of the record (JA 4148-4163). Note: page 4142, at which this statement is located, is incorrectly numbered as page 4148 in the Joint Appendix.

[11]Although latency periods (i.e., the time between exposure to a carcinogen and the appearance of a cancerous lesion) have been as short as two years, the potential range is as great as forty years--a fact pointed out by Dr. Gerarde himself (JA 3741). See also Hueper, Lawyers' Medical Cyclopedia § 38.46g (Exh. #135).

Petitioner-Dry Color Manufacturers Ass'n at 17, Dry Color Manufacturers Ass'n v. Dep't of Labor, 486 F.2d 98 (3rd Cir. 1973). The table below sets forth these discrepancies:

Allied Chemical Company, Haledon Plant
Workers Exposed to DCB

| | Data from Gerarde study of the plant | Data from industry-petitioners on the same plant |
|---|---|---|
| # of workers known dead | 18 | 33 |
| # of workers with cause of death known | 12 | ALL |
| # of workers with cancer | 4 | 5 |
| Type of cancer found | Prostate<br>Lung<br>Leukemia<br>Unknown | Prostate<br>Lung<br>Leukemia<br>Kidney<br>Gastrointestinal |

Industry-petitioners offer no explanation in their brief, nor is there any in the record, for these gross discrepancies--including the failure of the Gerarde study to account for 15 deaths previously reported by the employer. Since the authors base their statistical calculations on these inaccurate and incomplete figures (Br. 54-55), the conclusions drawn are clearly suspect. Thus, the credibility of this entire study is seriously at issue in this proceeding.

Furthermore, none of the "epidemiological" information from other plants' experiences cited by industry-petitioners (Br. 55) is conclusive; at most plants the latency period for cancer has not yet even been approached for those workers who have been followed. This is the case for the Upjohn plant, Letter of Dr. William Parnes (JA 4161) and the Chemetron plant, Letter of Dr. Joseph Mallov (Br. 56)--both of which are described as having "equivalent negative studies" by the industry-petitioners (Br. 55). Moreover, the industry-petitioners have misrepresented findings in the record on NIOSH's experience with these plants. To cite but one example, industry-petitioners state that "NIOSH had visited the Upjohn plant and had found no bladder tumors or problems among employees there but was still checking past employees" (Br. 51). In fact, NIOSH investigators had found a "definite excess of bladder cancer" at the Upjohn plant, Letter of Dr. William Parnes (JA 4161), but, since workers had been exposed to other carcinogens as well, NIOSH concluded that it was "too soon since the production of benzidine was stopped . . . to expect the incidence of cancer to be increased secondary to exposure to DCB . . ." Id.[12]

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[12]Petitioners make it appear as though there have been no cases of bladder cancer at the Upjohn plant, by stating that no tumors have been found among workers whose employment began after 1951 (Br. 55 & n.1). Thus, they have skillfully avoided mentioning the five cases of bladder cancer discovered among workers first employed before 1951--who were exposed to both benzidine and DCB, Affidavit of William Murray, The Upjohn Company, May 15, 1973 (JA 3670).

The human experience with DCB offers no conclusive evidence as to the non-carcinogenicity of that chemical, and scientific judgments cannot be based on such statistically unsound research, Legal Medical Cyclopedia § 38.48(E) (Exh. #135); Public Hearing (JA 1564, 1568). In addition, NIOSH representatives have repeatedly stressed the fallacies in drawing any type of negative conclusions on human carcinogenicity from epidemiological studies where a substance is shown to be a carcinogen in animals, Advisory Committee, July 13, 1973 (TR. 47-48, 57); August 8, 1973 (TR. 24-26, 79-81); Public Hearing (JA 1568). See also, Ad Hoc Committee Report (JA 330). Thus, from the above analysis, it is clear that the conclusion classifying DCB as a carcinogen is supported by the studies cited by respondents and the scientific review conducted by NIOSH. This proof provides substantial evidence for respondents' determination that DCB is a carcinogen. Nothing in the criticisms and the incomplete or inadequate studies offered by the industry-petitioners in any way undermines respondents' conclusion that DCB is a carcinogen.

## II. RESPONDENTS' DETERMINATION TO REGULATE CMME AS A CARCINOGEN WAS ENTIRELY PROPER

The question before this Court is whether respondents properly determined that CMME should be regulated as a carcinogen. The industry-petitioners conc[illegible]t regulation of CMME as a toxic

substance is entirely proper (Br. 2), but object to the decision to regulate it as a carcinogen. In our view the decision to treat CMME as a carcinogen was entirely proper for two reasons: first, as CMME is currently used in industry it is "invariably contaminated" (Br. 13) with an undisputed carcinogen--bis-chloromethyl ether ("BCME"), and thus as a practical matter CMME must also be treated as a carcinogen, and second, because the experimental evidence supports the conclusion that even "pure" CMME is a carcinogen.

There is no dispute as to the factual premises underlying the first of these reasons, and in fact petitioners in their own brief state that BCME is a "known potent human carcinogen" (Br. 7). Nor is there any dispute that the usual level of BCME contamination in industrial uses is 1-7% (JA 4073), although the Dow Chemical and Rohm and Haas chemical companies claim they can reduce the level to less than 1%(JA 1525,3975). However, industry-petitioners attempt to dismiss the necessity of regulating contaminated CMME by simply stating that "[g]iven the existing production technology, any one who uses CMME will have to comply with the standard for [BCME]" (Br. 14, n.1).[13] This argument overlooks the significant animal

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[13]One industry representative on the Standards Advisory Committee on Carcinogens, Dr. Ellington Beavers of the Rohm and Haas Company, stated that he "would dare to say there is no case in the real world in which anybody is using pure methyl-chloromethylether in any industrial process, or even in any laboratory process, except as a curiosity", July 20, 1973 (JA 2863) (emphasis added).

evidence which condemns industrial CMME as a carcinogen--evidence which is unfortunately confirmed by human experience--and the essential notice function of a separate standard for CMME.

The seriousness of exposure to contaminated CMME is evidenced by a recent case study. In a manufacturing plant where the compound used was nominally "CMME" (but was actually contaminated with BCME),[14] fourteen exposed workers developed lung cancer--eight times the number that would normally have been expected to develop the disease, Figueroa et al., Lung Cancer in Chloromethyl Methyl Ether Workers (JA 4072). NIOSH concluded that the BCME contaminant in the CMME may have been responsible for the cancers, Hazard Review (JA 3810-3811). This finding is supported by the experimental studies cited in the Statement of Reasons which make clear the highly carcinogenic potential of CMME contaminated with BCME (JA 845).

Moreover, the separate regulation of CMME performs an important notice function in that it explicitly identifies a compound (CMME) which invariably contains a highly carcinogenic contaminant (BCME) and directs the appropriate abatement of this hazard. Thus, the regulation puts on notice an employer who may be unaware of the BCME contaminant because he does not purchase commercial CMME, but still processes or produces it at his worksite. This notice also

[14] A Rohm and Haas facility outside Philadelphia.

provides workers with critical knowledge about worksite hazards. Without this separate regulation neither workers nor employers would suspect the serious danger of CMME exposure since only BCME would appear in the carcinogen standards. Even the warning labels and signs would refer to BCME whereas the product being used was known to the workers as CMME. Direct regulation of CMME also eliminates ad hoc determinations with respect to the percentage of BCME in the CMME which arise because BCME contamination must exceed 0.1% before the CMME would be considered a carcinogen, 29 C.F.R. § 1910 93h(a)(2) (JA 861).

It is apparent that respondents took a practical view of the situation and decided that CMME as presently in use was a potent carcinogen and should be regulated as such. It is irrelevant whether this is because of the contamination by BCME or because, as the evidence discussed below demonstrates, CMME is itself a carcinogen. If there comes a time when petitioners are able to produce or use CMME uncontaminated by a known carcinogen, then the question of the carcinogenicity of pure CMME may be something more than academic.[15] The important point is that workers receive proper

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[15]The following exchange took place at the July 20, 1973, meeting of the Standards Advisory Committee on Carcinogens after Dr. Ellington Beavers of the Rohm and Haas Company suggested that "in the interest of being objective and scientific" CMME be labelled as a "mixture":

> Dr. Samuel Epstein: " . . . in the interest of protecting those who are exposed to CMME, one should clearly recognize that this is
>
> (continued)

protection from cancer hazards and that their employers be explicitly directed to abate the hazard even if it is created by a potentially unidentified contaminant in another chemical.[16]

But in any event, the best scientific evidence now available indicates that CMME is itself a carcinogen (JA 3806-3808, 4067, 4079, 4089). Industry petitioners' contentions (Br. 23-25) that the CMME used in the animal experiments conducted by Van Duuren was

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(continued)

> material which contains highly carcinogenic impurities in varying concentrations.
>
> Therefore, I think that the problems of academic objectivity--important though they may be--in this area should not take precedence over the question of the protection of those who handle CMME, who otherwise would be inadvertently exposed to BCME.
>
> Therefore, for this reason, I think the cancer posting and labelling signs are as appropriate for CMME as they are for BCME.
>
> Dr. Beavers: I agree with that entirely. As a matter of fact, . . . I think this mixture until we know better ought to be treated as though it were pure bis-CME." (JA 2879-2880).

[16]Industry petitioners raised two other claims regarding the invalidity of classifying CMME as a carcinogen. First, they allege that this classification will remove any industry incentive to remove the BCME impurity in CMME (Br. 14). This consideration, however, is totally irrelevant to the Secretary's standard-setting authority under section 6(b)(5), 29 U.S.C. § 655(b)(5), and thus the Court need not reach the merits of this argument. Second, it is alleged that users will have to comply with two separate standards, CMME and BCME (Br. 14, n.1). However, the work practices and other substantive requirements including record-keeping requirements are virtually identical except that subsection (e)(2) will require the identification of both carcinogens on any labelling, compare 29 C.F.R. § 1910.93f (chloromethyl methyl ether) with 29 C.F.R. § 1910.93h (bis-chloromethyl ether). (JA 856,861)

contaminated with BCME, are simply not supported by factual data in the record,[17] nor are they concurred with by the scientists who performed the study. In a Letter to the Editor of Chemical and Engineering News, March 27, 1972, Van Duuren et al. state very explicitly that "both compounds [BCME and CMME] are carcinogenic to mice by skin application and by subcutaneous injection, and by the latter route also in rats" (JA 4963). Moreover, they state that the "bifunctional alkylating agent BCME is a more potent carcinogen than CMME, which is a monofunctional carcinogen."[18]

The industry petitioners counter this evidence by a claim that even in these experiments the CMME used was not sufficiently "pure" to permit any conclusion to be drawn as to its carcinogenicity (Br. 47-51). They even claim that a pure sample of CMME has been obtained only after five fractional distillations (Br. 25, n.1). Thus, according to this argument, the inevitable contamination by BCME precludes any conclusive finding as to CMME. The difficulty with this position, assuming arguendo its accuracy, is that it

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[17] The brief as well as the record references cited consist of unsupported opinions with regard to the purity of the chemical. The petitioners merely point to certain "inconsistencies" in the analytical results, none of which confirms the presence of BCME as a contaminant.

[18] Van Duuren et al., Alpha-Haloethers: A New Type of Alkylating Carcinogen (JA 4067); Van Duuren et al., Carcinogenicity of Haloethers (JA 4079); Van Duuren et al., Carcinogenicity of Isoters of Epoxides and Lactones: Aziridine Ethanol, Propane Sultone, and Related Compounds (JA 4089).

Van Duuren's studies which involve both rats and mice are summarized in the NIOSH Hazard Review (JA 3806-3808).

establishes more clearly than ever the need to regulate CMME as a carcinogen. If labc_atories, under carefully controlled conditions, cannot produce pure CMME, it is obvious that workers handling commercial batches of the chemical must be considered to be handling its carcinogenic contaminant BCME and protected accordingly. This is what respondents have done, and their decision to do so is compelled by the evidence and should therefore be sustained.

## CONCLUSION

For the reasons set forth above, the Secretary's determination that chloromethyl methyl ether and 3,3'-dchlorobenzidine are carcinogens should be upheld by this Court.

Respectfully submitted,

Alan B. Morrison
Bertram Robert Cottine

Attorneys for the Petitioners
in No. 74-1149*

Suite 700
2000 P Street NW
Washington, D.C. 20036
(202) 785-3704

June 21, 1974

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*The extensive assistance of Andrea M. Hricko, M.P.H. is gratefully acknowledged.

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BFGoodrich

The B. F. Goodrich Company

500 SOUTH MAIN STREET • AKRON, OHIO 44318 • PHONE: 216-379-2126

ADDRESS REPLY TO: DEPT. 0001 BLDG. WHB-4

DIRECTOR OF ENVIRONMENTAL AFFAIRS

July 12, 1974

Mr. Julius Jimeno
Docket 36
1726 M Street, N.W., Room 200
Washington, D. C. 20210

Dear Mr. Jimeno:

I am enclosing our laboratory report which fulfills the request by the Office of the Solicitor for further information on the technical details of testing commercially available charcoal filled canister and cartridge protective breathing devices.

The experimental approach is described in detail. The wide range in capacity for absorbing vinyl chloride by commercial absorbants is shown in Table 1 on page 4 and the clear superiority of activated charcoal is evident. The comparison of cartridge and canister data in Tables 2 and 3 indicates that depth of carbon bed is also a factor in capacity which must be balanced against pressure drop in the design of a respirator for breathing protection. The desorption experiments show that the recharging of cartridges and canisters is feasible.

Laboratory work is continuing. If further pertinent information develops, it will be submitted before August 23, 1974.

Very truly yours,

THE B.F.GOODRICH COMPANY

Roger W. Strassburg

Roger W. Strassburg, Ph.D.
Director of Environmental Affairs

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Enc.

| TO | FIRM OR ORGANIZATION AND LOCATION | SYMBOL |
|---|---|---|
| Dr. R. W. Strassburg | Akron; Loc. WHB-4; Dept. 6001 | |
| **FROM** | **FIRM OR ORGANIZATION AND LOCATION** | **DATE THIS LETTER** |
| Dr. M. M. O'Mara | Avon Lake Technical Center | July 2, 1974 |

SUBJECT

An Investigation of the Adsorption Properties of Vinyl Chloride Monomer on Commercial Carbon Filters

## Introduction

This report is a summary of our work on the adsorption characteristics of VCM on carbon filters which are used in conjunction with protective breathing masks. The basic objective of the study was to determine the adsorptive and desorptive characteristics of various, commercially available, carbon filters which are used as protection against inhaled organic vapors. This study involved vinyl chloride monomer only.

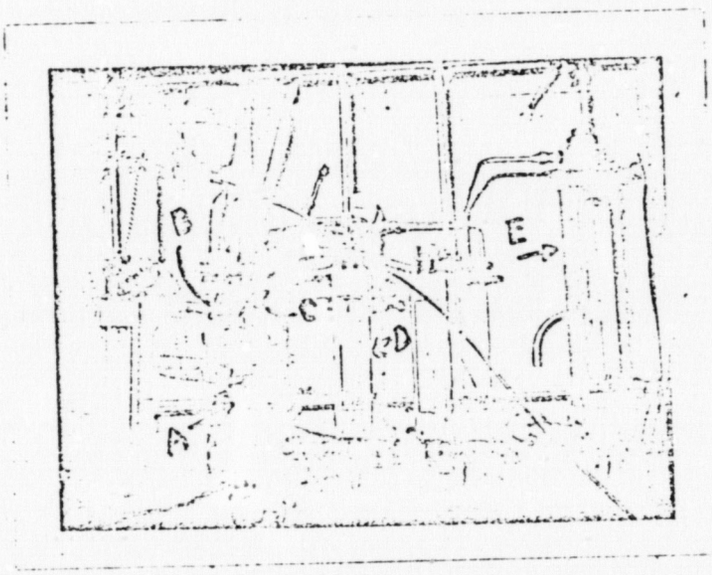
## Experimental Approach

An experimental flow chamber was constructed so that carbon filled cartridges and canisters could be subjected to a continuous flow of air containing vinyl chloride monomer. A continuous rather than batch monitoring method of analysis was chosen to indicate the presence of vinyl chloride monomer. A photograph of the basic flow chamber is shown in Figure 1. The vinyl chloride-air stream enters the carbon device at A. The scrubbed stream then exits the device at B. Line C is the continuous monitoring system for sensing vinyl chloride monomer in the air stream. Additional experimental data are contained in the Appendix. To demonstrate the type of data that is obtained from the experiment described above, a plot of VCM concentration versus time is shown in Figure 2. The rise in the horizontal baseline indicates incipient vinyl chloride monomer breakthrough.

In our initial experimental design, we used a portable Century Organic Vapor Analyzer to sense vinyl chloride monomer. The major problem with this analyzer was its inherent background which could not be subtracted electronically from the recorder output. To overcome this we replaced this instrument with a Bendix Hydrocarbon Analyzer. Both instruments are flame ionization units; Figure 2 is based on the output of the Bendix instrument. The Bendix instrument is well suited for the type of measurement carried out because of the following unique characteristics:

(1) low drift
(2) linear (vs. logarithmic) amplifier
(3) background zero supression
(4) excellent stability

Figure 1: Experimental VCM Flow Chamber




(A) vinyl chloride/air stream into cartridge holder

(B) cleaned air stream exit

(C) analyzer sampling line

(D) vinyl chloride flowmeter

(E) high capacity air flowmeter

Figure 2

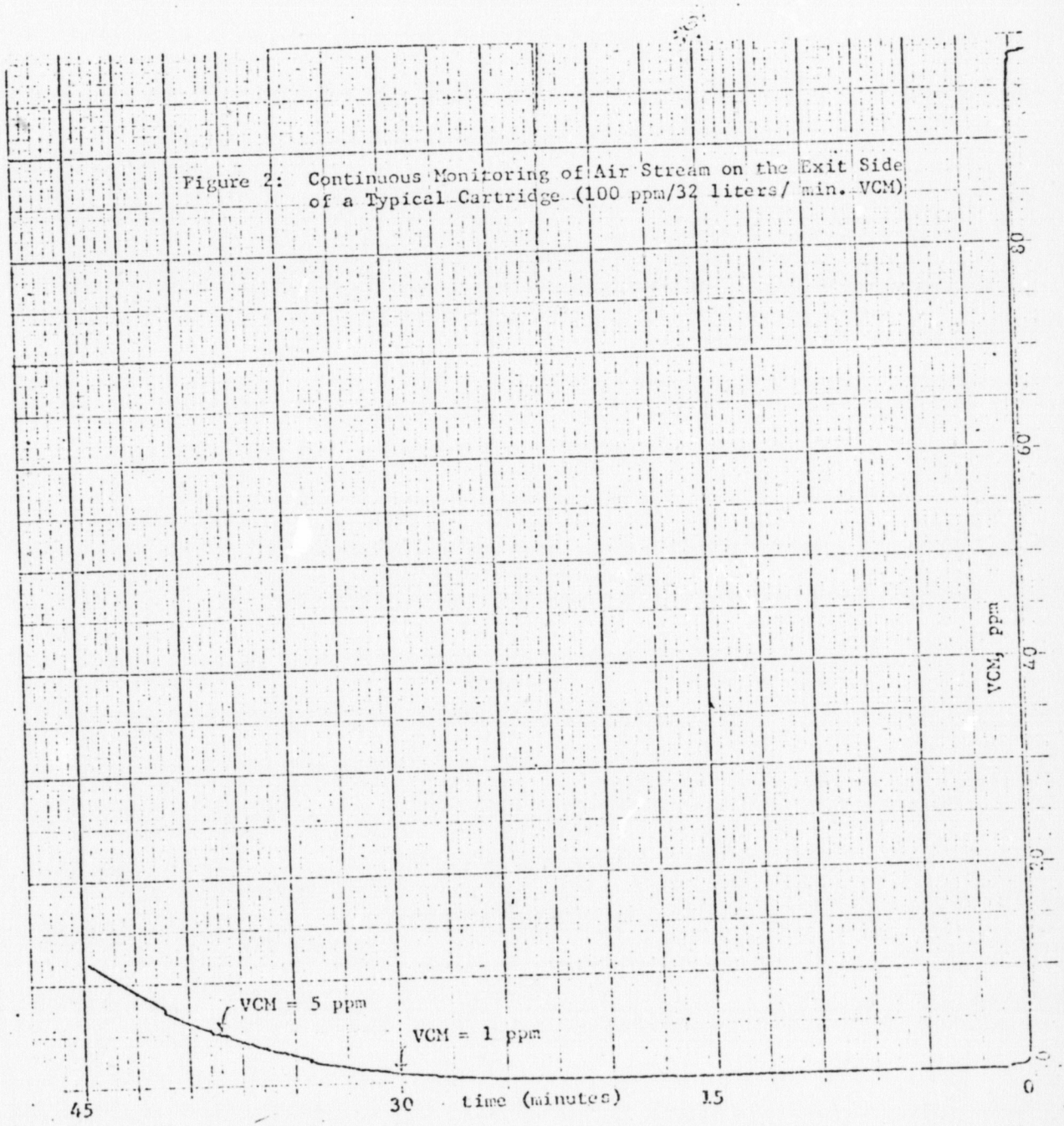



Figure 2: Continuous Monitoring of Air Stream on the Exit Side of a Typical Cartridge (100 ppm/32 liters/ min. VCM)

Experimental Results

(i) Initial Evaluation of Commercial Cartridges

A variety of commercial cartridges were evaluated with the Century analyzer in order to obtain a profile of their ability to retain vinyl chloride monomer. All evaluations were carried out at a flow of 30 liters per minute and a vinyl chloride concentration (volume/volume) of 100 parts-per-million. In these early evaluations, the time to 5 parts per million of vinyl chloride at the exit side of the carbon matrix was determined. This value is referred to as $T_5$ (in minutes). Table 1 contains a summary of the various cartridges evaluated and the corresponding $T_5$ values obtained.

Table 1

$T_5$[(1)] Values for Various Carbon Cartridges
When Tested at 30 liters/minutes and 100 ppm of Vinyl Chloride Monomer

| Cartridge | $T_5$[(1)], minutes |
|---|---|
| Welsh 7500-1 | 41, 34, 39, 44, 33 |
| American Optical AOR55 | 21 |
| Westvaco Nuchar WV-H 8X30 | 15 |
| Willson R-25 | 34 |
| Willson R-11 | 0 |
| American Optical R-51 | 29 |
| Willson R-21 | 42 ± 13 |
| Welsh 7400-1L | 93 |
| Welsh (Canister) 7800-1M | 678 |
| MSA Cartridge 44135 | 13 |

(1) $T_5$ refers to the time in minutes for the concentration of VCM at the exit end of the cartridge to reach 5 ppm.

It can be seen from these data that the commercial cartridges and canisters chosen for this study exhibit a broad range in ability to absorb vinyl chloride monomer. All of the 3-inch cartridges were effective from zero minutes (no VCM adsorption) to about 40 minutes. After initial vinyl chloride breakthrough there is a gradual rise to a value corresponding to the concentration of vinyl chloride in the air stream.

As expected, the 4-inch cartridge (Welsh 7400-1L) and the canister outperformed the 3-inch cartridges under these test conditions. It should be noted that in the end-use mask construction, two of the 3-inch cartridges are used. On the other hand, a single 4-inch cartridge or canister is used in masks employing these carbon devices. Thus to obtain a true evaluation of the 4-inch cartridge and canister, they must be exposed to an air flow that is double that used for the 3-inch cartridge evaluation. This type of evaluation is described below.

(ii) Detailed Evaluations of the Welsh Canister, 3-inch Cartridge and 4-inch Cartridge

The NIOSH requirement for testing protective masks calls for evaluations at the following atmospheric flow rates: 32 liters/minute and 64 liters/minute. The Welsh canister (7800-1M), the Welsh 4-inch cartridge (7400-1L) and the Welsh 3-inch cartridge (7400-1) were evaluated within these guidelines. Testing with the 3-inch cartridge was restricted to a flow rate of 32 liters/minute while that for the 4-inch cartridge and canister was limited to a flow rate of 64 liters/minute. In order to improve the accuracy of the measurement, a Bendix Total Hydrocarbon Analyzer was obtained for monitoring vinyl chloride monomer. Using this instrument in the experiment approach described above, measurements at 1 ppm VCM breakthrough ($T_1$) could be accurately obtained. Table 2 contains a summary of $T_1$ values obtained for the three Welsh cartridges and canisters. These data show that vinyl chloride breakthrough ($T_1$) is essentially the same for the 3-inch and 4-inch cartridges when tested at the two required flow rates. It is also obvious that breakthrough is quite dependent upon concentration. For the two cartridges, a 4-fold increase in VCM concentration caused a 50% increase in breakthrough time. The stronger dependence of VCM/air rate on breakthrough time is demonstrated by comparing data in Table 1 with that in Table 2. For example, comparing $T_5$ data (accurate $T_1$ data is not available in Table 1) it is seen that for the 4-inch cartridge there is a 50% increase in breakthrough ($T_5$) when the rate is increased from 30 liters/minute ($T_5$ = 93 minutes) to 64 liters/minute ($T_5$ = 48 minutes) at a VCM concentration of 100 ppm.

Table 2

$T_1$ (1) Values for the Welsh 3-inch, 4-inch Cartridges and Canister at Various Concentrations of Vinyl Chloride Monomer

I. Welsh 7500-1 (3-inch)

32 liters/minute

| VCM, ppm | $T_1$, minutes |
|---|---|
| 25 | 80 |
| 50 | 60 |
| 100 | 35 ($T_5$ = 44 minutes) |

II. Welsh 7400-1L (4-inch)

64 liters/minute

| VCM, ppm | $T_1$, minutes |
|---|---|
| 25 | 70 |
| 50 | 60 |
| 100 | 40 ($T_5$ = 48 minutes) |

III. Welsh 7800-1M (Canister)

64 liters/minute

| VCM, ppm | $T_1$, minutes |
|---|---|
| 25 | 522 (8.7 hrs.) |
| 100 | 342 (5.7 hrs.) |
| 1000 | 102 (1.7 hrs.) |

(1) $T_1$ refers to the time in minutes for VCM concentration to reach 1 ppm.

Considering only those data in Table 2 it can be shown that the amount of vinyl chloride adsorbed increases with increasing concentration of vinyl chloride in the air stream. The absolute amount of vinyl chloride adsorbed by the carbon in each of the experiments can be obtained from the following equation:

$$\text{VCM, cc} = \text{total rate (cc/min.)} \times \text{concentration VCM}\left(\frac{\text{ppm}}{10^6}\right) \times T_o$$

where $T_o$ is initial breakthrough at "zero" parts per million.

Once obtained, relative VCM adsorption efficiences can be calculated by dividing these values by the weight of the carbon in the cartridge. A summary of these data are contained in Table 3. It is evident that the efficiency of carbon to absorb vinyl chloride monomer is not constant but rather increases as the concentration of vinyl chloride monomer increases in the air. It is significant to note that the efficiency of carbon to adsorb vinyl chloride monomer is nearly constant for the two cartridges when compared at the same vinyl chloride concentration, even though the flow rates are significantly different. This sameness in efficiency, of course, relates back to the previous statement that these two cartridges offer the same degree of protection. As a final comment the very high efficiency of the carbon bed in the canister is responsible for the excellent (relative) protection this device provides.

It appears that emperical mathematical equations describing breakthrough times for the two types of cartridges could be readily developed since the adsorption efficiency at a given VCM concentration is constant. However, before this is attempted more data would be necessary at different flow rates and over a broader concentration range.

Table 3

Calculation of Absolute Adsorption of VCM (cc) on Carbon and Efficiencies (cc VCM/g Carbon)

I. Welsh 7500-1 (3-inch)

32 liters/minute

| VCM, ppm | VCM Adsorbed, cc | Efficiency(1), cc/g |
|---|---|---|
| 25 | 48.0 | 1.34 |
| 50 | 82.4 | 2.29 |
| 100 | 108.8 | 3.03 |

II. Welsh 7400-1L (4-inch)

64 liters/minute

| VCM, ppm | VCM Adsorbed, cc | Efficiency(2), cc/g |
|---|---|---|
| 25 | 88.0 | 1.31 |
| 50 | 160.0 | 2.38 |
| 100 | 227.0 | 3.39 |

III. Welsh 7800-1M (Canister)

64 liters/minute

| VCM, ppm | VCM Adsorbed, cc | Efficiency(3), cc/g |
|---|---|---|
| 25 | 777.6 | 2.51 |
| 100 | 1958.4 | 6.31 |
| 1000 | 6336 | 20.4 |

(1) cartridge contained 35.9g carbon

(2) cartridge contained 67.0g carbon

(3) canister contained 310.3g carbon

(iii) Desorption of Vinyl Chloride Monomer

It was of interest to study the desorption characteristics of vinyl chloride monomer from the cartridges. To accomplish this objective, the 3-inch Welsh cartridge was exposed to vinyl chloride monomer at 100 ppm and 32 liters/minute until initial breakthrough at 1 ppm (i.e. $T_1$) was achieved. At this point the vinyl chloride feed stream was shut off and the cartridge was exposed to clean air at 32 liters/minute. A skewed bell-shaped curve developed which maximized at 33 ppm (time = 84 minutes) and decreased to 0 ppm (time = 330 minutes). In actuality we were producing a gas chromatogram in which the carbon canister was a crude chromatographic column, the air was the carrier gas, the vinyl chloride was the sample and the Bendix analyzer was the detector. It is well known that one way to decrease the retention time in gas chromatography is to increase the flow rate. To demonstrate this phenomenon with the present system, we repeated the above experiment (3-inch cartridge, 100 ppm VCM, 32 liters/minute) except once initial VCM breakthrough occurred the vinyl chloride feed was discontinued and the clean air rate was increased to 64 liters/minute. At this increased flow rate, the bell shaped "chromatographic" curve was less skewed. The maximum now occurred at 36 ppm (time = 49 minutes) and decreased to 0 ppm (time = 194 minutes). This trace is shown in Figure 3. Thus by doubling the "carrier gas" flow rate from 32 liters/minute to 64 liters/minute, the "retention time" decreased by 42%.

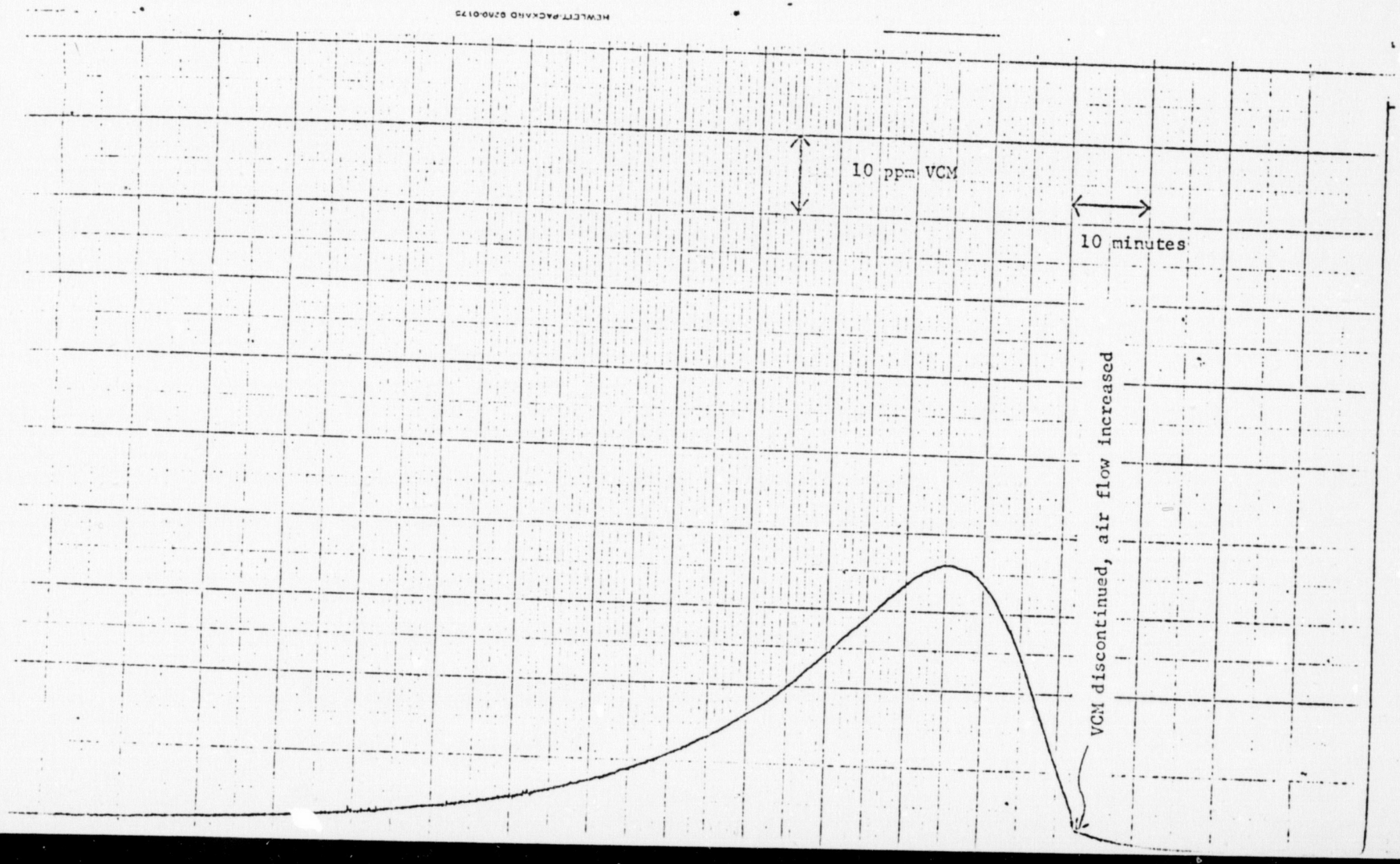
It is obvious that other chromatographic principles can be used to further decrease the desorption time of VCM on carbon. For example, higher flows in combination with heat could potentially lead to very rapid removal of the VCM from the carbon.

(iv) Performance of Cartridge after Repeated Adsorption-Desorption of Vinyl Chloride

Based on chromatographic principles, the cartridges used to adsorb vinyl chloride should be reusable once desorption has been carried out. To verify this, a 3-inch cartridge was exposed to vinyl chloride and desorbed at 64 liters/minute. This was repeated twice. This "regenerated" cartridge was then exposed to VCM at 100 ppm and 32 liters/minute. It was found that the efficiency to absorb vinyl chloride monomer was the same as found for a new cartridge. The breakthrough times for the regenerated cartridge were $T_1$ = 35 minutes and $T_5$ = 45 minutes. These values are identical to those values reported in Table 2 for a new 3-inch cartridge.

Figure 3

Desorption of VCM from 3-inch Welsh Cartridge at 64 liters/minute Clean Air



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Appendix I

## Experimental

### Vinyl Chloride Standards

Vinyl chloride monomer in air standards (19, 900, 9990 ppm) were obtained commercially from Precision Gas Products, Inc., Rahway, New Jersey 07065.

### Cartridges-Canisters

All cartridges and canisters were obtained commercially from the suppliers already mentioned. All devices were tested as received.

### Make-Up Air

In order to attain the high flow rates necessary, in-plant compressed air was used to dilute the vinyl chloride standards. This air stream was purified by means of an oil filter and a 9-inch (length) by 5-inch (diameter) carbon bed. The relative humidity of make up air after passage through the carbon was 25% at 74°F. Being in air probably had relative humidity of ca. 60%.

### Flowmeters

All streams were metered with F. & P. Co. precision bore flowmeters.

### Vinyl Chloride Analyzers/Recorder

The Century Organic Vapor Analyzer used in the initial phases of this work was purchased from Century Systems Corp., Arkansas City, Kansas 67005. The Bendix Total Hydrocarbon Analyzer (Model 8401) was purchased from Bendix, Ronceverte, W. Va. 24970. A Hewlett-Packard Model 7101B Strip Chart recorder was used to display the outputs from the Century and Bendix instruments.

4410 150

# Firestone Plastics Company

DIVISION OF THE FIRESTONE TIRE & RUBBER COMPANY

HARVEY S FIRESTONE FOUNDER

GENERAL OFFICES
P. O. BOX 699
POTTSTOWN, PENNSYLVANIA 19464

POTTSTOWN, PENNSYLVANIA

August 19, 1974

Mr. Julius Jimeno
Department of Labor
1726 H Street, N. W.
Room 2000
Washington, D. C. 20013

Re: OSHA Hearing on Occupational Exposure to Vinyl Chloride

Dear Mr. Jimeno:

During the cross-examination of the representatives of the Firestone Plastics Company at the OSHA hearing on vinyl chloride, we were asked to submit our most up-to-date in-plant monitoring data for the hearing record. Enclosed please find two sets of data covering our most recent VCM monitoring. One set is data taken from our plant in Pottstown, Pennsylvania and the other set from our plant in Perryville, Maryland.

Would appreciate it if this information can be made part of the hearing record.

Yours truly,

R. S. Brookman, Manager
Research, Development
and Technical Service

RSB:djs

Enclosures

150

# VCM PERSONNEL MONITORING

## POTTSTOWN PLANT

RECEIVED
AUG 6 1974
G. D. LLOYD

Firestone-(F)
INTEROFFICE

150

DATE AUGUST 6, 1974

TO MR. R. W. ARNOLD

FROM R. R. SMITH

REFERRING TO LETTER OF

SUBJECT V.C.M. PERSONNEL MONITORING

SUMMARY JULY 1 - JULY 31, 1974

| Classification | Range (PPM VCM) | No. of Readings | % | % Last Report Period |
|---|---|---|---|---|
| Tank Farm Operator | 0-10 | 1 | 14 | 20 |
| | 10-20 | 1 | 14 | 60 |
| | 20-30 | 0 | 0 | 20 |
| | 30-40 | 2 | 29 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 3 (1) | 43 | 0 |
| | | 7 | 100 | 100 |
| Reactor Operator, 31-43 Bank | 0-10 | 7 | 46 | 72 |
| | 10-20 | 3 | 20 | 14 |
| | 20-30 | 1 | 7 | 0 |
| | 30-40 | 1 | 7 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 3 (2) | 20 | 14 |
| | | 15 | 100 | 100 |
| Reactor Operator, 45-57 Bank | 0-10 | 3 | 22 | 33 |
| | 10-20 | 6 | 43 | 50 |
| | 20-30 | 1 | 7 | 17 |
| | 30-40 | 1 | 7 | 0 |
| | 40-50 | 1 | 7 | 0 |
| | >50 | 2 (2) | 14 | 0 |
| | | 14 | 100 | 100 |
| Reactor Operator, 60-70 Bank | 0-10 | 4 | 40 | 50 |
| | 10-20 | 5 | 50 | 50 |
| | 20-30 | 1 | 10 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 10 | 100 | 100 |

| Classification | Range (PPM VCM) | No. of Readings | % | % Last Report Period |
|---|---|---|---|---|
| Reactor Operator, 1-15 Bank | 0-10 | 4 | 45 | 50 |
| | 10-20 | 3 | 33 | 25 |
| | 20-30 | 1 | 11 | 0 |
| | 30-40 | 1 | 11 | 25 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 9 | 100 | 100 |
| Reactor Operator, 16-23 Bank | 0-10 | 4 | 50 | 75 |
| | 10-20 | 1 | 12.5 | 25 |
| | 20-30 | 1 | 12.5 | 0 |
| | 30-40 | 1 | 12.5 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 1 (3) | 12.5 | 0 |
| | | 8 | 100.0 | 100 |
| Stripper Operator, Bldg. I PVC | 0-10 | 5 | 62 | 50 |
| | 10-20 | 0 | 0 | 33 |
| | 20-30 | 2 | 25 | 17 |
| | 30-40 | 1 | 13 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 8 | 100 | 100 |
| Stripper Operator, Bldg. I BUTA. | 0-10 | 2 | 33 | 100 |
| | 10-20 | 2 | 33 | 0 |
| | 20-30 | 1 | 17 | 0 |
| | 30-40 | 1 | 17 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 6 | 100 | 100 |
| Stripper Operator, Bldg. II, 31-57 | 0-10 | 7 | 50 | 100 |
| | 10-20 | 3 | 22 | 0 |
| | 20-30 | 1 | 7 | 0 |
| | 30-40 | 1 | 7 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 2 (2) | 14 | 0 |
| | | 14 | 100 | 100 |

| Classification | Range (PPM VCM) | No. of Readings | % | % Last Report Period |
|---|---|---|---|---|
| Stripper Operator, Bldg. II, 60-70 Bank | 0-10 | 3 | 33 | 33.3 |
| | 10-20 | 4 | 45 | 0 |
| | 20-30 | 2 | 22 | 33.3 |
| | 30-40 | 0 | 0 | 33.3 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 9 | 100 | 100 |
| Relief Operator, Bldg. I | 0-10 | 12 | 70 | 63 |
| | 10-20 | 3 | 18 | 37 |
| | 20-30 | 2 | 12 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 17 | 100 | 100 |
| Relief Operator, Bldg. II | 0-10 | 6 | 35 | 60 |
| | 10-20 | 7 | 41 | 20 |
| | 20-30 | 1 | 6 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 3 (2) | 18 | 20 |
| | | 17 | 100 | 100 |
| Centrifuge Operator, Milk Area | 0-10 | 8 | 100 | 95 |
| | 10-20 | 0 | 0 | 5 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 8 | 100 | 100 |
| Centrifuge Operator, Spray Driers | 0-10 | 9 | 100 | 72 |
| | 10-20 | 0 | 0 | 21 |
| | 20-30 | 0 | 0 | 7 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 9 | 100 | 100 |

| Classification | Range (PPM VCM) | No. of Readings | % | % Last Report Period |
|---|---|---|---|---|
| Drier Operator, Spray Driers | 0-10 | 29 | 100 | 89 |
| | 10-20 | 0 | 0 | 11 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | > 50 | 0 | 0 | 0 |
| | | 29 | 100 | 100 |
| Bagger, Bulk & 5 Line Area | 0-10 | 9 | 100 | 89 |
| | 10-20 | 0 | 0 | 11 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | > 50 | 0 | 0 | 0 |
| | | 9 | 100 | 100 |
| High Press. Cleaner | 0-10 | 5 | 62.5 | 50 |
| | 10-20 | 0 | 0 | 25 |
| | 20-30 | 1 | 12.5 | 0 |
| | 30-40 | 1 | 12.5 | 0 |
| | 40-50 | 1 | 12.5 | 0 |
| | > 50 | 0 | 0 | 25 |
| | | 8 | 100.0 | 100 |
| Reactor Cleaners | 0-10 | 3 | 50 | 0 |
| | 10-20 | 3 | 50 | 33.3 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | > 50 | 0 | 0 | 66.6 |
| | | 6 | 100 | 100.0 |
| Supply Man, Reactor Room Mezz. | 0-10 | 3 | 100 | NOT |
| | 10-20 | 0 | 0 | |
| | 20-30 | 0 | 0 | TESTED |
| | 30-40 | 0 | 0 | |
| | 40-50 | 0 | 0 | |
| | > 50 | 0 | 0 | |
| | | 3 | 100 | |

| Classification | Range (PPM VCM) | No. of Readings | % | % Last Report Period |
|---|---|---|---|---|
| Maintenance | 0-10 | 27 | 71 | 71 |
| | 10-20 | 4 | 11 | 18 |
| | 20-30 | 5 | 13 | 3 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 2 (4) | 5 | 8 |
| | | 38 | 100 | 100 |
| Janitors | 0-10 | 6 | 86 | 100 |
| | 10-20 | 1 | 14 | 0 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | > 50 | 0 | 0 | 0 |
| | | 7 | 100 | 100 |
| Laboratory, Rubber | 0-10 | 6 | 67 | 100 |
| | 10-20 | 1 | 11 | 0 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 1 | 11 | 0 |
| | 40-50 | 1 | 11 | 0 |
| | > 50 | 0 | 0 | 0 |
| | | 9 | 100 | 100 |
| Laboratory, Resin | 0-10 | 19 | 100 | 90 |
| | 10-20 | 0 | 0 | 5 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | > 50 | 0 | 0 | 0 |
| | | 19 | 100 | 100 |
| Truckers | 0-10 | 12 | 92 | 93 |
| | 10-20 | 0 | 0 | 7 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 1 | 8 | 0 |
| | > 50 | 0 | 0 | 0 |
| | | 13 | 100 | 100 |

| Classification | Range (PPM VCM) | No. of Readings | % | % Last Report Period |
|---|---|---|---|---|
| Engineers | 0-10 | 8 | 67 | 77 |
| | 10-20 | 4 | 33 | 23 |
| | 20-30 | 0 | 0 | 0 |
| | 30-40 | 0 | 0 | 0 |
| | 40-50 | 0 | 0 | 0 |
| | >50 | 0 | 0 | 0 |
| | | 12 | 100 | 100 |
| Service & Utility | 0-10 | 31 | 83 | 89 |
| | 10-20 | 0 | 0 | 4 |
| | 20-30 | 3 | 8 | 7 |
| | 30-40 | 1 | 3 | 0 |
| | 40-50 | 1 | 3 | 0 |
| | >50 | 1 (5) | 3 | 0 |
| | | 37 | 100 | 100 |
| Comments | | | | |
| Temporary Personnel | 0-10 | 7 | 87 | NOT |
| | 10-20 | 1 | 13 | |
| | 20-30 | 0 | 0 | EMPLOYED |
| | 30-40 | 0 | 0 | |
| | 40-50 | 0 | 0 | |
| | >50 | 0 | 0 | |
| | | 8 | 100 | |

All values in this report are based on 10 min. continuous sampling.

Comments (Cont'd next page)

R. R. Smith

R. R. SMITH

RRS/njw
CC: Messrs. C. W. Engblom
R. S. Frain
K. H. Garner
C. J. Kleinert
G. D. Lloyd

Comments (Cont'd)

(1) Two of these readings traced to leaking oil col. compressor, since repaired. One >50 PPM reading taken while draining water from recycle stk. tanks 5 & 6. Drains to be rerouted in near future.

(2) Readings generally higher in Bldg. II this report period due to finding and eliminating leaks after shutdown i.e.

(a) Leaking valves on reactor flush system drains repaired.
(b) Leaking valves on U.S. filter replaced.
(c) Fumes escaping from R #60-70 drop line vent cyclone eliminated via a water leg.
(d) Leaking packers on homogenizer repaired.

(3) Several readings taken one shift (7-18-74-B) when G.C. not functioning properly. Other people in same area at same time = low test results.

(4) Both high readings in maint. taken in areas subsequently declared temporary mask areas.

(5) Seal blew on R #45 dispersion pump - repaired.

RRS/njw
8/6/74

150

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Jos. Alexander | 10-17-51 | 5624 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. continuous | 0.2 | Restacking 6337 in warehouse |
| 5-3-74 | 10 min. continuous | 22.0 | Watching while Reinert cleaned in Reactor #55 after 6338 batch. |
| 5-3-74 | 10 min. continuous | 104.5 | Cleaning in Reactor #55 after 6338 batch. Ambient = 60 P.P.M. due to Northeast wind over Nash exhaust. |
| 5-12-74 | 10 min. Continuous | 2.1 | Line 6, South Pulsair on catwalk while changing bags. |
| 7-15-74 | 10 min. continuous | 0.7 | Palletizing @ Saddlebagger Bulk Area 965 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| James Alford | 11-17-47 | Salary | Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-11-74 | 10 min. continuous | 6.0 | Making round of spray dryers. |
| 8-11-74C | 10 min. Continuous | 11.0 | Foreman - Spray dryers |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| G. ALLEN | 7-1-74 | 1512 | SERVICE & UTILITY |

| DATE TESTED | TEST DURATION | P. P. M. | COMMENTS |
|---|---|---|---|
| 7-15-74 | 10 MIN. CONTINUOUS | 0.2 | WAREHOUSE AREA |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Francis D. Almond | 7-22-68 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-12-74 | 10 min.<br>Continuous | 2.6 | Sampling Derrick, Bulk Area. |

Reactor Oper.

| NAME | HIRE DATE | CLOCK NO. |
|---|---|---|
| Edmund F. Andrzejewski | 5-28-46 | 5594 |

| DATE TRAINED | HOURS TRAINED | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-4-74 | 4 | 10* | 8 HV off-vent fan over R#42 on. *Century reading = 40 P.P.M. |
| 4-25-74 | 10 min. Continuous | 14 | Reactor Oper., Bldg. II At desk. Century = 20 P.P.M. |
| 5-5-74 | 10 min. Continuous | 31.0 | Charging 6338 batch to R #53. |
| 5-9-74 | 8 Hr. | 11.3 | Bldg. II, Reactor Operator, R #45-52 Bank. Pump malfunction = less than normal size sample. |
| 5-12-74 | 10 min. Continuous | 13.5 | Reactor Oper. Bldg. II, 45-52 bank with all H.V. on but fresh air fan over R #42 off. |
| 5-12-74 | 10 min. Continuous | 12.8 | Same area but with fresh air fan on. |
| 5-22-74 | 10 min. Continuous | 4.1 | Bldg. II, Reactors #45 - 57. Both Jet and Nash exhausts raised. Jets = 30 Ft. Nash = 15 Ft. Century = 25 P.P.M. |
| 5-29-74 | 10 min. Continuous | 9.7 | Bldg. II, Reactor Room charging 6338. |
| 6-10-74 | 10 min. Continuous | 12.1 | Bldg. II, Reactor Room Charging 6337 |
| 6-19-74 | 4 hr. TWA | 3.7 | Bldg. 2, Reactor Operator |
| 7-10-74 | 10 MIN. CONTINUOUS | 8.8 | BLDG. 2, REACTOR LEVEL REACTORS 31 & 38 BANKS. |

[illegible]owski — 5-28-46 — 5594

| | | |
|---|---|---|
| 10 min. Continuous | 122 | R #45-52 Bank. ViCl heavy in Relief area. Can be smelled. Plast. filter has leaking valves. |
| 10 min. Continuous | 10.6 | Bldg. II, R #45-52 bank. |
| 10 min. Continuous | 12.6 | Charging 45-52 Bank, Bldg. II |
| 10 min. Continuous | 56.0 | Charging 6337 to R #53. Found leaking drop valve flange on R #35, tightened & rechecked. |
| 10 min. Continuous | 10.6 | After finding leak under R #35. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Raymond Arnold | 9-5-61 | Salary | Factory Manager |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-12-74 | 10 min. continuous | 13.0 | Making round of Bldg. I, 2nd & 3rd. floor. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| M. Artim | 11-30-59 | 8413 | MAINTENANCE |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-2-74 | 10 min. Continuous | 6.7 | Mechanic Bldg. I, Stripper Level, working on Str. #4 which was open. R#5 D.V. open also. |
| 8-12-74 | 10 min. Continuous | 13.2 | Working on Comp. #14. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| W. J. Atwell | 2-13-61 | 8489 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-30-74 | 10 min. Continuous | 8.0 | Welder, Refabricating stainless steel pipe recovered from under plastisol blend tanks. |
| 5-11-74 | 10 min. Continuous | 4.5 | Working in Line 3 area. |
| 6-14-74 | 10 min. Continuous | 0.1 | Welding in Weld area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Joseph Babb | 9-2-65 | 6985 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-3-74 | 10 min. continuous | 3.0 | Line 8 Bagger. Type 605. |
| 5-4-74 | 10 min. Continuous | 43.0 | Bldg. II, Reactor Level, Using Sugino in R #67. Century = 45 |
| 5-6-74 | 10 min. Continuous | 51.0 | Bldg. II, Using Sugino in R #63 and L. P. water hose on R #62. Century = 30 P.P.M. |
| 5-9-74 | 10 min. Continuous | 17.5 | Bldg. II, Upper Mezz. making up CD-2085 Sol'n. Century = 25 |
| 6-11-74 | 10 min. Continuous | 5.2 | Temporary Bldg. II Plast. stripper operator. |
| 6-27-74 | 4 hr. Periodic | 17.6 | Bldg. II, Reactor level. High pressure flusher. |
| 7-15-74 | 10 min. continuous | 1.0 | Trucking in Warehouse. |
| 7-18-74 | 10 min. Continuous | 14.5 | Watching while Kusior cleaned in R #55. |

| NAME | HIRE DATE | CLOCK NO.( | CLASSIFICATION |
|---|---|---|---|
| Douglas A. Babczak | 6-11-74 | 1470 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-17-74 | 10 min. Continuous | 5.1 | Cleaning R #18, Top man |
| 8-12-74C | 10 min. Continuous | 2.8 | Flushing lime slurry tk. Tank Farm. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| David Baldwin | 1-29-68 | Salary | Process Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-3-74 | 10 min. continuous | 12.4 | Making round of Building I Reactor room with Reactor 5 open and air horn on. |
| 7-18-74 | 10 min. Continuous | 11.9 | Charging special batch, Bldg. I |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| M. N. Barkasi | 6-10-68 | 9187 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min.<br>Continuous | 0.4 | Electrician<br>Tin-Carpenter Shop |
| 6-11-74 | 10 min.<br>Continuous | 64.0 | Bldg. II working on reactor water charge meter. Went over to R #48 which was being flushed with lance but vent fan was not pulling. Century went to 1.0% Hi press. flushers were told to wear masks. F.N. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John Beadle | 4-1-53 | 5578 | Trucker |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 11.5 | Removed full skids from Line 4 & 6 and pressed them. |
| 5-8-74 | 10 min. Continuous | 11.2 | Line Trucking. |
| 6-12-74 | 10 min. Continuous | 1.1 | Line Trucking |
| 7-15-74 | 10 min. continuous | 0.33 | Line Trucking |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| M. W. Beard | 12-16-59 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-12-74 | 10 min. Continuous | 12.3 | Lab. Supervisor, making round of Bldg. II Reactor Room. |
| 8-12-74A | 10 min. Continuous | 0.7 | Working in Resin Lab. Mill room |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Ernest P. Beasley | 8-30-71 | 3173 | Centrifuge |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 7.2 | Line 4 area, Type 6337 |
| 7-15-74 | 10 MIN. CONTINUOUS | 20.0 | BLDG. 2 REACTOR LEVEL |
| 7-16-74 | 10 MIN. CONTINUOUS | 41.0 | BLDG. 2 REACTOR LEVEL |
| 7-17-74 | 10 min. Continuous | 5.2 | Bagger Line 8, Type 654. |
| 7-18-74 | 10 min. Continuous | 0.4 | Line 7 Bagger, Type 654. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Carl N. Bechtel | 2-11-63 | 0864 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 1.5 | Bagger, Line 6, Type 6411 Contury = 15.0 P.P.M. |
| 4-28-74 | 10 min. Continuous | 5.0 | Line 6, Bagger, Type 6411 |
| 5-5-74 | 10 min. Continuous | 4.0 | Line 6, Bagger, Type 6366 |
| 5-12-74 | 10 min. Continuous | .15 | Line 3. |
| 6-11-74 | 10 min. Continuous | 1.0 | Line 6, Bagging 6411 |
| 6-13-74 | 10 min. Continuous | 3.7 | Line 6, Bagging 6411 |
| 7-16-74 | 10 MIN. CONTINUOUS | 0.6 | LINE 6 BAGGER |
| 7-18-74 | 10 min. Continuous | 0.2 | Line 6 Bagger, Type 6411 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| E. L. Beidler | 6-27-60 | 8453 | Maintenance (Pipefitter) |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 160 | Bldg. II Roof. Installing support on extension of R #45 Bank Jet. Vapors coming from Nash exhaust. Designated mask area until Jet exhaust moved. Century = 10-100 P.P.M. |
| 5-1-74 | 10 min. Continuous | 0.2 | Bldg. II Roof. Same area as 4-26-74 test but Nash exhaust relocated. |
| 6-13-74 | 10 min. Continuous | 6.0 | Reclaiming used pipe in Pipe Shop. |
| 7-16-74 | 10 min. continuous | 14.0 | Bldg. II Reactor Room |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William I. Beidler | 5-9-55 | 8294 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-11-74 | 10 min. Continuous | 3.0 | Pipefitter, Hooked up ViCl T/C #94684 to unload. |
| 6-14-74 | 10 min. continuous | 10.6 | By break-area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Mike Bercute | 1-15-70 | Salary | Process Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. continuous | 3.9 | Making rounds Bldg. II; Reactor room, homog., dispersion pump and checked level in Blend Tank 13. |
| 5-13-74 | 10 min. continuous | 1.6 | Working on heat exchanger, Line 8 after running 654 type. |
| 6-14-74 | 10 min. continuous | 2.5 | Office |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Russell Bergeman | 12-11-62 | 0823 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 1.5 | Running Line 3 Bagger |
| 5-4-74 | 10 min. Continuous | 0.9 | Running Line 3 Bagger (FPC-654) |
| 5-8-74 | 10 min. Continuous | 3.6 | Stacking FPC-6366 at Line 3. |
| 6-10-74 | 10 min. Continuous | 0.9 | Stacking 605 Line 3. |
| 7-16-74 | 10 min. Continuous | 2.2 | Line 3 Bagger |
| 7-18-74 | 10 min. Continuous | 0.1 | Bagging on Line 3. |
| 8-11-74 | 10 min. Continuous | 1.7 | Running L-3 Bagger (605) |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Paul Berger | 1-16-52 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-8-74 | 10 min. Continuous | 149.0 | Technician Taken while collecting Vi Cl samples in Tk. Farm. (In the future this will be a fresh air mask job.) |
| 8-12-74A | 10 min. Continuous | 5.9 | Working in Analytical Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Berlyn Berkley | 5-22-52 | Salary | Foreman |

| DATE TESTED | TEST DURAION | P.P.M | COMMENTS |
|---|---|---|---|
| 5-2-74 | 10 min. Continuous | 10.0 | Foreman - Bldg. I Under freeze tks. & Relief Area. |
| 6-14-74 | 10 min. continuous | 4.0 | Bldg. I Area |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Russel Biehl | 11-5-58 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-5-74 | 10 min. Continuous | 34 | Bldg. II, Making round of Reactor Room. |
| 5-15-74 | 10 min. continuous | 1.0 | In Resin Lab |
| 6-14-74 | 10 min. Continuous | 1.4 | In Resin Lab. |
| 7-16-74 | 10 min. continuous | 0.2 | In Resin Lab |
| 8-12-74A | 10 min. Continuous | 0.4 | In Lab. offices |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| E. W. Blatt | 2-15-71 | 0473 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-7-74 | 10 min.<br>Continuous | 6.6 | Working in Bldg. I Reactor Room.<br>Instrument Repair Man. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| F. J. Blizniak | 8-30-65 | 6973 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-13-74 | 10 min. Continuous | 12.2 | Bldg. II, Plast. Pumpout area changing rupture disc. on compressor. |
| 8-12-74B | 10 min. Continuous | 0.4 | Around Maintenance shops |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| G. J. Boaman | 8-3-64 | 5784 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-13-74 | 10 min. continuous | 3.4 | Working on unground product collector Line 8. |
| 6-13-74 | 10 min. Continuous | 0.3 | Walking around Bldg. II roof w/30' stack complete. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| James Bradley | 10-24-47 | Salary | Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-4-74 | 10 min. continuous | 5.2 | Bulk Area Foreman. Checked level in blend tanks 6-8 & 10. 454-9300 & 9300. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| BRENDLINGER | 6-17-74 | 8840 | SERVICE & UTILITY |

| DATE TESTED | TEST DURATION | P. P. M. | COMMENTS |
|---|---|---|---|
| 7-16-74 | 10 MIN. CONTINUOUS | 20.5 | BLDG. 2 REACTOR LEVEL |
| 7-18-74 | 10 min. continuous | 1.3 | Line 12 palletizer, Type 9339 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert S. Brightbill | 4-30-52 | 5159 | Stripper Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 2 | Dropped a batch. |
| 5-4-74 | 10 min. Continuous | 39 | Dropped a batch - was in stripper and reactor area. Century = 20-40 P.P.M. |
| 5-8-74 | 7-8 Hr. TWA | 21 | |
| 5-11-74 | 10 min. Continuous | 2.9 | Stripping area Plast. and Reactor Room. |
| 5-14-74 | 10 min. continuous | 9.8 | Dropping a plastisol batch. |
| 7-16-74 | 10 min. continuous | 12.6 | In Reactor Room & Stripper Area, Bldg. II, Stripper #18. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Russell J. Brightbill | 5-1-53 | 3555 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 2.0 | Bagger, Line 4, Type 6337 Century = 10.0 P.P.M. |
| 4-28-74 | 10 min. Continuous | 6.8 | Bagger, Line 4, Type 6337 |
| 5-3-74 | 10 min. continuous | 45.5* | Line 4 bagger, Type 6338. *Note: This bag had been on Marusinski right before (7,700 P.P.M.'s). Possible residue ViCl in bag. His relief on Line 4 was only 0.5 P.P.M., which is expected norm. |
| 5-8-74 | 10 min. Continuous | 2.8 | Line 4 Bagger, Type 6337. |
| 6-10-74 | 10 min. Continuous | 7.7 | Bagging 6337 on Line 4. Sample taken while North Carolina Univ. was taking charcoal sample. |
| 6-13-74 | 10 min. Continuous | 0.8 | Bagging 6337 on Line 4. |
| 7-15-74 | 10 MIN. CONTINUOUS | 2.1 | LINE 4 AREA |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Richard Bruch | 12-16-59 | Salary | Foremen |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 5 | Bldg. I, Foreman. Taken in reactor room. Century = 15 P.P.M. |
| 6-10-74 | 10 min. Continuous | 8.8 | Bldg. I, Reactor Room. |
| 7-15-74 | 10 min. continuous | 9.5 | Bldg. I [illegible] Floor |
| 7-18-74 | 10 min. Continuous | 6.3 | Touring [illegible] |
| 8-8-74 | 10 min. Continuous | 1.8 | Rubber Lab. & Str. Level, Bldg. I |
| 8-12-74B | 10 min. Continuous | 7.8 | Reactor Room PVC side, Bldg. I |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| N. K. Budick | 1-12-53 | 8246 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 180 | Pipefitter, Bldg. II Roof. Installing support on extension of R #45 Bank Jet. Vapors coming from Nash exhaust. Designated mask area until Jet exhaust moved. Century = 10-100 P.P.M. |
| 5-1-74 | 10 min. continuous | 0.2 | Bldg. II, Roof same areas as 4-26-74 test but Nash exhaust relocated. |
| 6-13-74 | 10 min. Continuous | 4.0 | Cutting pipe in pipe shop. |
| 7-16-74 | 10 min. continuous | 0.7 | Pipe Shop |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Dennis Burfete | 1-15-73 | 8081 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. Continuous | 0.8 | Mechanic, working in shop. |
| 5-1-74 | 10 min. Continuous | 39 | Changing seal on Reactor 68 |
| 7-15-74 | 10 MIN. CONTINUOUS | 30 | WORKING ON MOTOR MAINTENANCE AREA |
| 7-16-74 | 10 min. continuous | 0.1 | Top Line 3, fixing spinner. |
| 8-12-74C | 10 min. Continuous | 2.1 | In Maintenance shop. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| J. Bush | 1-21-74 | 9502 | Maintenanco |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-4-74 | 10 min. Continuous | 1.5 | Pipefitter, Working © Line 11. |
| 7-16-74 | 10 min. continuous | 87 | Pipefitter, Bldg. II, around Reactor #38, packers on 80 Homo. broke. |
| 7-17-74 | 10 min. Continuous | 5.3 | Blanking out R #53, 47 |
| 8-11-74C | 10 min. Continuous | 18.0 | Bldg. II Pipefitter |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William Cacciacarne | 1-31-53 | 5626 | Centrifuge Oper. |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. continuous | 9 | Spray Driers - Bagging 6411 on Line 6 door open to blend tanks. |
| 5-3-74 | 10 min. continuous | 5 | Bagging 605 at Line 8. |
| 5-9-74 | 10 min. Continuous | 4.9 | Bagging 654 at Line8. |
| 5-10-74 | 10 min. continuous | 2.3 | Bagging 654 at Line 8. |
| 5-16-74 | 10 min. Continuous | 11.3 | Bagging 654 at line 8. |
| 6-11-74 | 10 min. Continuous | 6.9 | Making up bags Line 6. |
| 7-16-74 | 10 min. continuous | 4.4 | Line 8 & near-by Area. |
| 7-17-74 | 10 min. Continuous | 3.5 | Bagging on Lines 8 & 6. |
| 8-11-74C | 10 min. Continuous | 6.8 | Line 8-Centrifuge-Bagging 654 |

9205

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| George Cake | 3-16-53 | 5531 | SERVICE & UTILITY ~~Hi Press. Clean~~ |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 23 | Flusher, Flushed Reactors 46 & 50 |
| 5-3-74 | 10 min. continuous | 1.4 | Bagging FPC 450 on Line 13. |
| 5-11-74 | 10 min. Continuous | 7.2 | Bagging FPC-454 at Line 13. |
| 8-12-74C | 10 min. Continuous | 2.4 | Dumping wet 470 into line 5 - for redry. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| G. L. Carter | 7-16-62 | 8434 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min.<br>Continuous | 8.6 | Pipefitter.<br>Taken in machine-shop. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| G. E. Christ, Jr. | 12-17-56 | 8313 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min.<br>Continuous | 3.8 | Mechanic<br>In Mechanic Shop replacing seal on pump. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Glenn D. Christman | 6-3-74 | Salary | Temporary Personnel (Lab.) |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 8-18-74 | 10 min. Continuous | 0.8 | Paste Room. |
| 8-12-74A | 10 min. Continuous | 1.5 | Working in Plast. make-up room. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert Christy | 3/19/56 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-19-74 | 10 min. Continuous | 0.2 | Lab. using gas chromatograph. |
| 8-12-74A | 10 min. Continuous | 0.7 | Working in Analytical Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John Chubb | 9-9-47 | Salary | General Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-30-74 | 10 min. Continuous | 6.1 | On tour Bldg. I stripper to Bldg. II Reactor rooms. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Harry Cirullo | 11-12-62 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. continuous | 3.2 | In Resin Lab. |
| 6-12-74 | 10 min. Continuous | 6.4 | Making round in Bldg. II Reactor Room |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| George Clements | 5-20-57 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-2-74 | 10 min. Continuous | 8.3 | Technician Bldg. II, Relief Area & Warehouse. |
| 5-15-74 | 10 min. continuous | 4.0 | Solution Makeup Room in Resin Lab |
| 8-12-74A | 10 min. Continuous | 0.6 | In Lab. offices |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Harold M. Clevenstine | 4-17-46 | 8331 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 26 | Pipefitter, Bldg. II Checking for leaking flange, R #32. Century = 25 P.P.M. |
| 5-5-74 | 10 min. Continuous | 15.0 | Bldg. II, Removing drop valve R #53 after 6338 batch. |
| 5-11-74 | 10 min. continuous | 6.2 | Bldg. II - Removing lump from drop valve R#73, 654 type. |
| 5-17-74 | 10 min. continuous | 36.3 | Bldg. II, Reactor Room Century = 20-25 P.P.M. |
| 5-22-74 | 10 min. Continuous | 3.2 | Working Bldg. II Reactor Room. R #38 Century = 25 P.P.M. |
| 5-24-74 | 10 min. Continuous | 7.4 | Working Bldg. II Reactor room, on 2" ball valve from R #55 after 6338 batch. |
| 6-10-74 | 10 min. Continuous | 15.0 | Bldg. II, Reactor Room Century = 15-20 P.P.M. |
| 6-14-74 | 10 min. continuous | 3.1 | Replacing Charge Line |
| 6-24-74 | 4 hr. Periodic | 27.0 | Bldg. II, Reactor and Stripper levels. |
| 7-10-74 | 10 MIN. CONTINUOUS | 8.2 | BLDG. ? REACTOR LEVEL |
| 7-17-74 | 10 min. Continuous | 26.5 | Cleaning suction line to #100 Homo. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Allen Clouser | 7/15/74 | Salary | Temporary Personnel (Lab.) |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 8-12-74C | 10 min.<br>Continuous | 1.9 | Lab sample man. In Resin Lab. at gramatic balance and filtering batches. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert Coldren | 8-15-65 | Salary | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-13-74 | 10 min. continuous | 0.4 | In Electrical shop. |
| 6-13-74 | 10 min. Continuous | 12.0 | Bldg. II between Lamp #17 & 18 |
| 7-19-74 | 10 min. Continuous | 22.7 | Bldg. II, 1st floor. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William M. Collom | 11-19-62 | C815 | Relief Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 569 | Pumpout Plast. dumping out heel from stripper. MASK |
| 4-28-74 | 10 min. Continuous | 6.6 | Plast. pumpout by desk. Century = 15 P.P.M. |
| 4-30-74 | 10 min. Continuous | 1.8 | Plast. pumpout area Century = 8.0 P.P.M. |
| 5-2-74 | 10 min. Continuous | 22.0 | Same area. Century = 15 P.P.M. |
| 5-3-74 | 10 min. continuous | nil | Same area. Century = 5 P.P.M. |
| 5-4-74 | 10 min. Continuous | 6.0 | Same area. Century = 8 P.P.M. |
| 5-5-74 | 10 min. Continuous | 1.9 | Same area. Century = 10 P.P.M. |
| 5-13-74 | 10 min. Continuous | 4.3 | Same area. Century = 10 P.P.M. |
| 5-14-74 | 10 min. Continuous | 9.6 | Same area. Century = 10 P.P.M. |
| 5-15-74 | 10 MIN. CONTINOUS | 2.0 | SAME AREA. CENTURY = 8 P.P.M. |
| 5-16-74 | 10 min. Continuous | 3.6 | Same area. |
| 5-17-74 | 10 min. continuous | 6.7 | Same area. |
| 6-11-74 | 10 min. Continuous | 1.8 | Same area. |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 6-24-74 | 4 hr. Periodic | 26.0 | Same area. |
| 7-15-64 | 10 MIN. CONTINUOUS | 11.2 | SAME AREA |
| 7-16-74 | 10 MIN. CONTINUOUS | 295 | SAME AREA |
| 7-17-74 | 10 min. Continuous | 21.0 | Bldg. II, Pumpout level. |
| 7-18-74 | 10 min. Continuous | 4.8 | Bldg. II, Pumpout area. |
| 8-1-74 | 10 min. continuous | 0.4 | Bldg. II Relief Area |
| 8-12-74B | 10 min. Continuous | 1.1 | Around desk and knock-out tks. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John J. Connelly | 7-19-50 | 5593 | Senior Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 3 | Bldg. I, Buta. Stripper Operator. Century = 10 P.P.M. |
| 4-29-74 | 10 min. continuous | 61.2 | Cleaning in Reactor #42 after 6411 Type. |
| 5-1-74 | See John Smith on 5-1-74A- used air horn on drop valve. | | |
| 5-12-74 | 10 min. Continuous | 34.5 | Cleaning in R #56 after 6338 batch. Fresh air on but no air horn on drop valve. Century in room = 15 P.P.M. |
| 5-12-74 | 10 min. Continuous | 26.0 | Same Reactor with air hore on drop valve. |
| 6-10-74 | 10 min. Continuous | 16.5 | Removing chunks of 9282 from R #11. |
| 8-12-74A | 10 min. Continuous | 3.2 | In Warehouse. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert Comm | 6-4-62 | 0003 | Dryer Operator |

| DATE TESTED | SENSE DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 1.5 | Line 7 Bagger |
| 4-28-74 | 10 min. Continuous | 4.4 | Line 7 Bagger |
| 5-3-74 | 10 min. continuous | 5.6 | Line 7 Bagger Type 605. |
| 6-10-74 | 10 min. Continuous | 13.6 | Centri Bagging 605, Line 7 |
| 6-11-74 | 10 min. Continuous | 0.4 | Centri Bagging 605, Line 7 |
| 6-13-74 | 10 min. Continuous | 6.3 | Centri Bagging 605, Line 7 |
| 7-17-74 | 10 min. Continuous | 0.1 | Bagger Line 4, Type 6337. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| J. Demyan | 11-26-46 | 5427 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-12-74 | 10 min.<br>Continuous | 17.5 | Watcher for Connelly cleaning in R #56 after 6338 batch. Fresh air fan on but no air horn on drop valve. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Richard Diehl | 8-3-59 | Salary | Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-19-74 | 10 min. Continuous | 0.1 | Engineers Offices. |

Reactor Operator

| NAME | HIRE DATE | CLOCK NO. |
|---|---|---|
| Leroy Dotterer | 7-15-52 | 5526 |

| DATE TESTED | HRS. TESTED | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-22-74 | 4 | 15.7 | Reactor Operator, Bldg. II |
| 4-26-74 | 10 min. Continuous | 835 | Charging R #31, Type 9282, Also got whif of leaking relief valve on R #35. R #31 pres. guage not working, got whif when hooking up portable guage. Also got some when opening relief valve. |
| 4-28-74 | 10 min. Continuous | 24.5 | Bldg. II, PVC Reactor level. Charging R #31 & 34, Type 9282 Century = 35 P.P.M. |
| 4-30-74 | 10 min. Continuous | 23.0 | Bldg. II, PVC Reactor Level charging R #50 type 6411 Century = 25 P.P.M. |
| 5-1-74 | 10 min. Continuous | 17.0 | Same area. Charging R #53 Type 6338. Century = 30 P.P.M. |
| 5-2-74 | 10 min. Continuous | 31.0 | Same Area. Charging R #40 Type 6366. Century = 30 P.P.M. |
| 5-5-74 | 10 min. Continuous | 18.0 | Same area. Charging R #31, Type 9290. Century = 25 P.P.M. |
| 5-6-74 | 8 Hrs. Periodic | 27.5 | Same area. |
| 5-8-74 | 10 min. Continuous | 10.8 | Same area. Charging R #35, Type 9290/ Century = 20 P.P.M. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Leroy Dotterer | 7-15-52 | 5526 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-9-74 | 10 min. Continuous | 29.0 | Bldg. II, PVC Reactor Level. Century = 35 P.P.M. |
| 5-10-74 | 10 min. Continuous | 15.0 | Same area. Charging R #31 & 32, Type 965. Century = 25 P.P.M. |
| 5-12-74 | 10 min. Continuous | 12.5 | Same area. Century = 12 P.P.M. |
| 5-13-74 | 10 min. Continuous | 13.3 | Same area. Century = 15 P.P.M. |
| 5-14-74 | 10 min. Continuous | 14.5 | Same area, charging R #31, Type 9269A. Century = 20 P.P.M. |
| 5-15-74 | 10 MIN. CONTINUOUS | 11.4 | BLDG. 2, REACTOR AREA, CHARGING R #43, TYPE 6411 & P #35 TYPE 9269A. CENTURY = 18 P.P.M. |
| 5-16-74 | 10 min. Continuous | 11.9 | Same area. Charging R #43, Type 6411. |
| 5-17-74 | 10 min. continuous | 8.1 | Same area charging R-43, Type 6411. |
| 6-11-74 | 10 min. Continuous | 2924 | Charging 31 and 34 PVC Reactors area 10-15 Century, others monitored near this time 8 P.P.M. |
| 6-13-74 | 10 min. Continuous | 9.1 | In Bldg. II Reactor Room. |
| 6-20-74 | 4 hr. TWA | 3870 | No explanation. Same area. |
| 7-10-74 | 10 MIN. CONTINUOUS | 8.6 | BLDG 2 REACTOR AREA, CHARGING REACTOR 36. CENTURY = 20 PPM. |

LEROY DOTTERER 7-15-52 5526

| | | | |
|---|---|---|---|
| 7-15-74 | 10 MIN. CONTINUOUS | 16.5 | BLDG. 2 REACTOR LEVEL CHARGING R 32 |
| 7-16-74 | 10 MIN. CONTINUOUS | 19.0 | SAME AREA |
| 7-17-74 | 10 min. Continuous | 9.6 | Bldg. II, Reactor Level. |
| 7-18-74 | 10 min. Continuous | 26.0 | Bldg. II, Reactor level. |
| 7-26-74 | 10 min. Continuous | 6.1 | Charging, 45-52 Bank. |
| 8-1-74 | 10 min. continuous | 17.5 | Charging Behind Panelboard Bldg. II |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Paul Drauschak | 7-16-52 | 5560 | Trucker |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 4.8 | Taking empty drums from Line 10 area to Warehouse. |
| 8-12-74A | 10 min. Continuous | 3.2 | Trucking in Warehouse. |

Stripper Operator

| NAME | HIRE DATE | CLOCK NO. |
|---|---|---|
| Robert G. Drendall | 4-15-46 | 5662 |

| DATE TESTED | HRS. TESTED | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-19-74 | 4 | 11 | Stripper Oper. Bldg. I Found pin hole in sample bag. Sample smaller than normal. |
| 4-22-74 | 4 | 6.5 | Nash pumps were not running. |
| 4-27-74 | 10 min. Continuous | 30 | Stripper Oper., Bldg. I, PVC. While sampling two 4414 batches. Century = 20-150 P.P.M. |
| 5-2-74 | 10 min. Continuous | 3.2 | Bldg. I, PVC Stripper W/Drop Valve R# 5 open & Str. #4 open for Maint. |
| 5-3-74 | 10 min. Continuous | 2.6 | Bldg. I, PVC Stripper Area. |
| 5-5-74 | 10 min. Continuous | 8.1 | Bldg. I, Sampling R #10 & 14, 9300 type. |
| 5-9-74 | 8 Hrs. | 35.0 | Bldg. I, Stripper Operator. Sampling batches and flushing reactors during this period. |
| 5-10-74 | 10 min. Continuous | 20.1 | Bldg. II, Reactor Room opened & flushed R #9 & 10 after allowing to air out thru drop valve for 5 min. 9300 type. |
| 5-12-74 | 10 min. Continuous | 34.0 | Flushing R #9 after 9300 batch. Reactor open and aired thru D.V. for 12 min. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert G. Drendall | 4-15-46 | 5662 | Stripper Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-14-74 | 10 min. continuous | 263.0 | Took grab bag while running 9300 Batch thru sizing screen. Operator had mask on. |
| 5-23-74 | 10 min. continuous | 1.7 | Stripper Oper. PVC Side |
| 6-6-74 | 4 hr. TWA | 11.4 | Stripper Operator, PVC Side. |
| 6-10-74 | 10 min. Continuous | 4.4 | Stripper Oper. PVC Side. |
| 6-11-74 | 10 min. Continuous | 11.2 | Sampled R #1 and flushed R #1, both mask jobs. Taken while N.C.U. was taking charcoal tube sample. |
| 7-12-74 | 10 MIN. CONTINUOUS | 22.0 | BROKE & OPENED REACTOR # 11 & 8 AFTER 965 BATCHES. |
| 7-26-74 | 10 min. Continuous | 4.3 | On 2nd and 3rd floor, Bldg. I. |
| 8-1-74 | 10 min. continuous | 7.1 | Bldg. I PVC Stripper. Pump off while sampling and wearing mask. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Claude A. Dye | 1-16-53 | 5559 | Centrifuge Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 2.5 | Rotary Dryer by desk. |
| 4-29-74 | 10 min. Continuous | 1.5 | At Rotary Control Panel Desk. |
| 5-4-74 | 10 min. Continuous | 3.3 | Rotary Dryer by desk. |
| 6-7-74 | 4 hr. TWA | 0.6 | Rotary Dryer by desk and at Panel Board. |
| 6-11-74 | 10 min. Continuous | 0.2 | At Panel Board, Bulk area. |
| 6-14-74 | 10 min. Continuous | 2.8 | At Panel Board, Bulk area. |
| 7-15-74 | 10 MIN. CONTINUOUS | 0.2 | AT PANEL BOARD, BULK AREA |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| G. M. Dykie | 8-31-64 | 6004 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 3.0 | Cement Lay Brick, etc. Taken in X-Ray Room of Lab. |
| 6-13-74 | 10 min. Continuous | 22.5 | Bldg. II, Mezz. |
| 7-26-74 | 10 min. Continuous | 9.1 | Laying curbing around hose station, Bldg. II Reactor Room. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Guy Eckenroth | 6-17-74 | 1472 | Temporary Personnel |

| DATE TESTED | TEST DURATION | P.P.M. | CONTENTS |
|---|---|---|---|
| 7-18-74 | 10 min. Continuous | 9.1 | Bldg. I, PVC Stripper level. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| F. L. Edris | 10-17-46 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 3.5 | Dept. Mgr. 778 While running gas chromatograph. |
| 7-18-74 | 10 min. Continuous | 16.5 | In Analytical Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Thomas S. Elias | 1-20-48 | 5530 | Stripper Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 3.5 | Bldg. I, PVC Stripper level. |
| 4-29-74 | 10 min. Continuous | 10.3 | Stripper Level, Bldg. I Century = 15-20 P.P.M. |
| 4-30-74 | 10 min. Continuous | 3.2 | Same area Century = 12 P.P.M. |
| 5-1-74 | 10 min. Continuous | 2.9 | Same area. Century = 7 P.P.M. |
| 5-2-74 | 10 min. Continuous | 71.0 | Bldg. I, Reactor Level. Flushing R #8 and R #9 with H.P. (250 psig) Water. Century = 100 → 800 P.P.M. |
| 5-3-74 | 10 min. continuous | 6.9 | Building I PVC Stripper level. Century = 8 P.P.M. |
| 5-4-74 | 10 min. Continuous | 86.0 | Bldg. I, PVC Stripper Level and Reactor Level, Flushing reactors with H.P. water hose. |
| 5-5-74 | 10 min. Continuous | 1.7 | Bldg. I, PVC Stripper Level. Century = 8 P.P.M. |
| 5-6-74 | 10 min. Continuous | 19.0 | Same area. Bleed off valve on transfer pump on right side of desk went off for 3-5 sec. Century went as high as 300 P.P.M. @ desk. Elias not in immediate area but close enough to be effected. |
| 5-8-74 | 8 Hr. Periodic | 5.0 | Same area. |

4413

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Thomas S. Elias | 1-20-48 | 5530 | Stripper Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-9-74 | 10 min. Continuous | 22.0 | Bldg. I, Stripper and Reactor Levels. Century = 30 P.P.M. |
| 5-10-74 | 10 min. Continuous | 1.9 | Bldg. I, PVC Stripper area. Century = 8 P.P.M. |
| 5-13-74 | 10 min. Continuous | 5.3 | Bldg. I, PVC Stripper Area. Century = 15 P.P.M. |
| 5-14-74 | 10 min. Continuous | 10.0 | Same area. Century = 18 P.P.M. |
| 5-15-74 | 10 MIN. CONTINOUS | 1.7 | SAME AREA. CENTURY = 8 P.P.M. |
| 5-16-74 | 10 min. Continuous | 31.0 | Same area. |
| 5-17-74 | 10 min. continuous | 3.6 | Same area. |
| 6-5-74 | 4 hr. TWA | 8.8 | Same area. |
| 6-11-74 | 10 min. Continuous | 3.0 | Same area. |
| 6-14-74 | 10 min. Continuous | 11.0 | Same area. |
| 7-16-74 | 10 MIN. CONTINUOUS | 1.0 | SAME AREA |
| 7-18-74 | 10 min. Continuous | 8.1 | Bldg. I, PVC Stripper Level. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Carl Engblom | 6-12-61 | Salary | Process Engineering Manager |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-3-74 | 10 min. continuous | 1.6 | Building I PVC Stripper Area. |
| 6-14-74 | 10 min. continuous | .6 | Office |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Samuel W. Engleman | 8-16-46 | 5670 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. continuous | 5.2 | Redrying 470 Line 5 |
| 5-6-74 | 10 min. Continuous | 1.7 | Replacing bags on cat walk outside of Line 6, North of primary collector. |
| 5-9-74 | 10 min. Continuous | 38.6 | Lancing R #50 after 6366 batch. Century = 15-40 P.P.M. during test. |
| 5-14-74 | 10 min. continuous | 8.0 | Bagging at line 8, 654 and in bottom of Line 6 Pulsair. |
| 6-12-74 | 10 min. Continuous | 7.4 | Bagging at Line 7, 605 |
| 7-15-74 | 10 min. continuous | 0.3 | Line 3 Centrifuge |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Leroy R. Erb | 3-21-47 | 3884 | Centrifuge Oper. |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 1.4 | Bulk area at panel board. |
| 5-4-74 | 10 min. continuous | 7.0 | Bulk area at panel board. |
| 5-6-74 | 10 min. Continuous | 1.8 | Bulk area at panel board. And under Centrifuge Line 12. |
| 6-5-74 | 4 hr. TWA | 1.8 | Bulk area. |
| 6-12-74 | 10 min. Continuous | 2.1 | Bulk area, drying 9282, 9339, 454, Lines 11, 12, and 13 |
| 7-16-74 | 10 min. continuous | 0.4 | Bulk Area, Drying 9269, 9334 & 454 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| G. D. Eshelman | 10-23-52 | 6616 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 2 | Stacking at Line 3 |
| 5-4-74 | 10 min. Continuous | 2.4 | Stacking FPC-654 at Line 3. |
| 5-11-74 | 10 min. Continuous | 3.9 | Running Line 3 Bagger. |
| 5-12-74 | 10 min. Continuous | 1.4 | Stacking 6366 at Line 3. |
| 5-15-74 | 10 MIN. CONTINOUS | 0.8 | STACKING 605 AT LINE 3. |
| 5-16-74 | 10 min. continuous | 2.1 | Stacking 605 at line 3. |
| 6-6-74 | 4 hr. TWA | 3.4 | Bagging at Line 6 - 6366 |
| 6-12-74 | 10 min. Continuous | 4.4 | Bagging at Line 6, 6411 |
| 7-16-74 | 10 min. continuous | 2.2 | Bagging at Line 6, 654 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Edward Eshmont | 11-27-47 | Salary | Engineer Jr. Chem. |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-4-74 | 10 min. Continuous | 2.0 | Working in Warehouse. |
| 6-13-74 | 10 min. Continuous | 1.2 | Resin Lab. Office. |
| 7-19-74 | 10 min. Continuous | 8.1 | Resin Lab. Office. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Stanley G. Falinski | 3-12-59 | 3438 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 2.5 | Line 8 Bagger Century = 15 P.P.M. |
| 5-6-74 | 10 min. Continuous | 29.5 | Bldg. II, Inside of R #78 cleaning agitator. Century = 30 P.P.M. @ Manhole. |
| 5-12-74 | 10 min. Continuous | 0.15 | Line 3 Bagger. Century = 12 P.P.M. |
| 6-11-74 | 10 min. Continuous | 3.8 | Bagging at saddle bagger, 9282 type. |
| 7-15-74 | 10 MIN. CONTINUOUS | 0.1 | BULK AREA CODING PVC BAGS |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| F. Farrelly | 5-1-72 | 7629 | Painter |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. continuous | 1.5 | Spray painting Mezz. at Line 4 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| D. Faut | 7-16-74 | 1526 | Temporary Personnel |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-16-74 | 10 min. Continuous | 0.1 | Installing bags inductaire 7 Line |
| 7-18-74 | 10 min. Continuous | 2.0 | Cleaning Railroad car in unloading Bldg. |
| 8-11-74C | 10 min. Continuous | 0.9 | S&U - Bag maker L-X1 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Benjamin Fick | 9-7-71 | 3187 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 3.0 | Line 3, Bagger Operator |
| 4-28-74 | 10 min. Continuous | 5.0 | Line 3, Palletizer |
| 6-10-74 | 10 min. Continuous | 3.2 | Line 3, Bagging 605 |
| 6-13-74 | 10 min. Continuous | 1.6 | Line 3, Bagging 605 |

NAME HIRE DATE CLOCK NO. CLASSIFICATION

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| D. Fidler | 7-22-74 | 1535 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 8-12-74B | 10 min. Continuous | 5.6 | Around Panel Board, Desk. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William Fisher | 12-16-52 | Salary | Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-6-74 | 10 min. Continuous | 2.1 | Bulk area foreman. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Edward S. Florczak | 7-12-52 | 5648 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 6.8 | Bagging Line 4. 6337 |
| 6-6-74 | 4 hr. TWA | 0.4 | Bagging Line 4 - 6337 |
| 6-12-74 | 10 min. Continuous | 0.7 | Bagging Line 4, 6337 |
| 7-15-74 | 10 min. continuous | 0.7 | Bagging Line 4, 6337 |
| 8-12-74A | 10 min. Continuous | 1.4 | Bagging 6337 on Line 4. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| David Foley | 2-12-68 | Salary | Laboratory Sample Man |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 6-7-74 | 4 hr. TWA | 3.0 | Sampling in Lab. |
| 7-18-74 | 10 min. Continuous | 1.2 | Lab. |
| 8-12-74A | 10 min. Continuous | 0.8 | Making round of Bldg. I |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Joe Foley | | Salary | Process Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-19-74 | 10 min. Continuous | 0.2 | Engineers office. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Frank Formando | 11-18-47 | Salary | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 7 | Master Mechanic. Taken in Relief area Bldg. II and back dock. |
| 6-14-74 | 10 min. continuous | 2.8 | Office |
| 7-16-74 | 10 min. continuous | 1.2 | In Maintenance Office |
| 8-12-74 | 10 min. Continuous | 1.4 | Between Foreman and Production Managers office. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| David W. Frain | 10-15-56 | Salary | Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 15 | In Reactor Area Bldg. II, for the 10 min. period. Trying to strip Reactor, stuck batch. |
| 5-8-74 | 10 min. Continuous | 11.6 | Foreman, Bldg. II, Reactor Room. |
| 5-9-74 | 10 min. Continuous | 19.5 | Bldg. II, Reactor Room. Century readings from 25-100 P.P.M. Apparently sucking vapors from roof. |
| 5-12-74 | 10 min. Continuous | 17.0 | Bldg. II, Stripper Level. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Richard S. Frain | 12-3-47 | Salary | Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-12-74 | 10 min. Continuous | 19.0 | Foreman in Reactor Room at 60 & 70 Bank. Fresh air fan over R #75 off. |
| 6-14-74 | 10 min. continuous | 2.5 | Office |
| 7-19-74 | 10 min. Continuous | 7.0 | Making round Bldg. I |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| R. W. Freas | 10-18-71 | 4321 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. Continuous | 169 | Pipefitter, working in Bldg. II, Reactor room. Cleaned light glass on Reactor 39 (had just been cleaned). Checked rupture disc. on Reactor 54 which had not been gas checked. |
| 5-5-74 | 10 min. Continuous | 15 | Pipefitting work on Compressor #13. |
| 5-12-74 | 10 min. Continuous | 10.1 | Closing up R #6 and putting spool in it also. |
| 7-17-74 | 10 min. Continuous | 2.4 | In Maintenance Shops. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Ray Freedman | 4-10-51 | 5534 | Relief Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 6 | Bldg. II, Pumped out Strippers 11 & 12 |
| 5-1-74 | 10 min. Continuous | 9.1 | Starting up compressors after they had been drained. |
| 5-4-74 | 10 min. Continuous | 6.9 | In relief area. |
| 5-9-74 | 7-8 Hrs. TWA | 19.5 | |
| 5-15-74 | 10 MIN. CONTINOUS | 2.4 | PUMP OUT BLDG. 2 |
| 5-16-74 | 10 min. continuous | 3.4 | Pump out Bldg. 2 |
| 6-12-74 | 10 min. Continuous | 22.0 | Pump out Bldg. II |
| 7-15-74 | 10 MIN. CONTINUOUS | 17.0 | PUMP OUT BLDG. 2 |
| 7-16-74 | 10 min. continuous | 51 | 80 Homo Packers Blew. |
| 8-11-74C | 10 min. Continuous | 59.0 | Bldg. II Pumpout |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Al Gainer | 3-9-71 | 0482 | MAINTENANCE |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-16-74 | 10 min. continuous | 0.1 | Maintenance Shop (Electrician) |
| 7-19-74 | 10 min. Continuous | 0.9 | In Elec. Shop. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Andrew Gall | 5-22-51 | 5536 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. continuous | 11 | |
| 4-28-74 | 10 min. continuous | 49 | Charging R32 |
| 5-1-74 | 10 min. Continuous | 10.8 | Charging 31 & 32 Reactors. |
| 5-2-74 | 10 min. Continuous | 23 | Charging R #34 - Century 20 |
| 5-7-74 | 10 min. Continuous | 37 | Charging R #32 & 38 |
| 5-8-74 | 7-8 Hr. TWA | 42 | Some high Century readings in Reactor room (100 P.P.M.) due to air direction - came in heater-ventilators. |
| 5-12-74 | 10 min. Continuous | 16 | Finished charging R #31 & 32 (heads closed) |
| 5-13-74 | 10 min. continuous | 24 | Transfering to R #43. |
| 5-14-73 | 10 min. continuous | 26 | In reactor room. |
| 5-15-74 | 10 MIN. CONTINOUS | 12.9 | BUILDING 2 REACTOR ROOM. |
| 5-16-74 | 10 min. continuous | 8.1 | Charging R #33 (head closed) |
| 6-10-74 | 10 min. Continuous | 11.4 | Bldg. II R. R. |
| 7-15-74 | 10 MIN. CONTINUOUS | 35 | CHARGING R # 33 IN BLDG. |
| 7-16-74 | 10 min. continuous | 141.2 | Bldg. II, Reactor Room after 80 Homo packers blew. |

| NAME | | | |
|---|---|---|---|
| Andrew Gall | 5536 | 5/22/51 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-17-74 | 10 min. Continuous | 4.8 | Charging R #31 |
| 7-18-74 | 10 min. Continuous | 4.8 | Bldg. II, Charging PVC Reactor. |
| 8-11-74C | 10 min. Continuous | 22.5 | Bldg. II, Reactor Room |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Al Gainer | 3-9-71 | 0482 | MAINTENANCE |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-16-74 | 10 min. continuous | 0.1 | Maintenance Shop (Electrician) |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert Ganter | 5-30-74 | 1446 | Trucker |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 6-10-74 | 10 min. Continuous | 7.0 | Line trucking |
| 6-14-74 | 10 min. Continuous | 1.9 | Line trucking |
| 7-15-74 | 10 MIN. CONTINUOUS | 4.4 | START UP LINE 4 BAGGING |
| 7-16-74 | 10 min. Continuous | 1.0 | Bagging 605 on 6 line. |
| 7-18-74 | 10 min. Continuous | 2.6 | Bagging on 6 line. |
| 8-11-74C | 10 min. Continuous | 7.7 | Line 6 bagger |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Kenneth Garner | 10-18-54 | Salary | Production Manager |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-11-74 | 10 min. continuous | 3.7 | Inspecting installation work on 2nd & 3rd floor Line 6 and on Bldg. I, roof. |
| 8-12-74 | 10 min. Continuous | 1.2 | Between Foreman and Production Managers office. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Earl R. Gebert | 6-10-46 | 5683 | Relief Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 14.0 | Bldg. I., Pulled and cleaned strainer under Str. #3, 4301 type. Strainer was almost full of oversize. |
| 5-1-74 | 10 min. Continuous | 3.3 | Bldg. I, at operators desk. |
| 5-2-74 | 10 min. Continuous | 10.4 | Bldg. I, Under Blend Tks. 5-10 for 10 min. |
| 5-5-74 | 10 min. Continuous | 10.2 | Bldg. I, Relief area at desk. |
| 5-10-74 | 8 Hrs. | 6.9 | Bldg. I, Relief Operator |
| 5-11-74 | 10 min. continuous | 6.5 | Draining water from Nash K.O. pot. |
| 5-14-74 | 10 min. continuous | 6.8 | Pumping out FL-3142 Batch. |
| 6-5-74 | 4 hr. TWA | 3.9 | Same Area. |
| 6-10-74 | 10 min. Continuous | 17.0 | Pumping out Str. #3, 9282 Century = 18 P.P.M. |
| 6-11-74 | 10 min. Continuous | 2.2 | Relief, Bldg. I - taken while N.C.U. was taking charcoal tube sample. |
| 7-12-74 | 10 MIN. CONTINUOUS | 4.0 | RELIEF BLDG. 1 |
| 7-16-74 | 10 min. continuous | 7.0 | Relief Bldg. I - Changing Filters On Pieco |
| 7-19-74 | 10 min. Continuous | 4.0 | Bldg. I, Relief area. |
| 8-1-74 | 10 min. continuous | 3.6 | Bldg. I Relief Area. Pumping out Stripper #4. 9282 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| E. L. Geiger | 3-22-71 | 0484 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-1-74 | 10 min. Continuous | 5.6 | Pipefitter, Bldg. I Working in Reactor Room. |
| 5-4-74 | 10 min. Continuous | 31 | In Bldg. I reactor area. (Same time Krisco got 251 P.P.M.) Century 20-30 |
| 5-10-74 | 10 min. continuous | 5.2 | In Bldg. I Reactor Area |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| B. Gibbs | 7-22-74 | 1538 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 8-12-74B | 10 min. Continuous | 7.2 | Cleaning R #9. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Peter Giessmann | 7-23-59 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 5.5 | Lab. Technician. Working in Rubber Lab. Taken while sampling an SL-987 batch R #17. |
| 4-28-74 | 10 min. Continuous | 1.6 | Paste man-opened oven door and removed drawdowns while testing. |
| 5-3-74 | 10 min. continuous | 1.4 | Building I - Rubber Lab. |
| 5-4-74 | 10 min. continuous | 94.0 | Sampling two vinyl chloride cars with air mask on. |
| 5-10-74 | 10 min. Continuous | 2.0 | In Rubber Lab |
| 5-13-74 | 10 min. continuous | Trace | Milling 654 in Resin Lab |
| 5-15-74 | 10 min. continuous | 0.6 | Milling GFE on 9300 type. |
| 6-10-74 | 10 min. Continuous | 0.4 | Milling contam. sheets. |
| 6-12-74 | 10 min. Continuous | 0.5 | In paste room. |
| 7-18-74 | 10 min. Continuous | 6.1 | Rubber Lab. and Bldg. I Reactor room. |
| 8-12-74A | 10 min. Continuous | 1.0 | Working in Resin Lab. Mill room |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| E. G. Giles | 7-1-68 | 6065 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-8-74 | 10 min. Continuous | 15.2 | Instrument Man. Bldg. I, Buta. Reactor Level working on R #20 instrumentation. Century = 15 P.P.M. |
| 5-10-74 | 10 min. Continuous | 1.6 | Bldg. I, PVC Stripper area. Repairing Control Valve on R #8. Century - 10 P.P.M. |
| 5-14-74 | 10 min. Continuous | 13.0 | Bldg. II, Reactor Level Century = 18 P.P.M. |
| 6-13-74 | 10 min. Continuous | 8.5 | Working on Bldg. II Reactor Instruments. |
| 7-17-74 | 10 min. Continuous | 9.1 | Bldg. II, Reactor Level. Working on R #71 temperature controls. |
| 8-12-74B | 10 min. Continuous | 28.0 | Check pressure system on R #41, 76, 78 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Joesph Gill | 10-13-47 | 5502 | Tank Farm |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 31.5 | Purification Bldg. at Desk. Century = 70-150 P.P.M. |
| 4-29-74 | 10 min. Continuous | 30.1 | Century = 70-150 P.P.M. |
| 4-30-74 | 10 min. Continuous | 28.0 | Purification Bldg. Century = 40 @ Desk |
| 5-1-74 | 10 min. Continuous | 26.0 | Purification Bldg. and Hook-up Rain Tank Car of Vi Cl. |
| 5-2-74 | 10 min. Continuous | 25.5 | Purification Bldg. and Rail cars. |
| 5-3-74 | 10 min. continuous | 29.0 | Same area. Century = 70 @ desk. |
| 5-4-74 | 10 min. Continuous | 18.5 | Same area. Century = 35 @ desk. |
| 5-5-74 | 10 min. Continuous | 21.0 | Same area. Century = 30 @ desk. |
| 5-6-74 | 10 min. Continuous | 16.5 | Same area. Century = 30 @ Desk. |
| 5-8-74 | 10 min. Continuous | 11.0 | Same area. Century = 20 @ Desk. |
| 5-9-74 | 8 Hrs. Periodic | 30.0 | General Tank Farm Area. |
| 5-10-74 | 10 min. Continuous | 31.0 | Purification Bldg. Century = 35 P.P.M. @ Desk and 75 P.P.M. @ North wall. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Joseph Gill | 10-13-47 | 5502 | Tank Farm |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-13-74 | 10 min. Continuous | 6.0 | Making Round in Tank Farm area. |
| 5-14-74 | 10 min. Continuous | 20 | Making Rounds and in Purification Bldg. |
| 5-15-74 | 10 MIN. CONTINOUS | 8.9 | SAME AREAS. |
| 5-16-74 | 10 min. Continuous | 9.5 | Purification Bldg. at desk. |
| 5-17-74 | 10 min. continuous | 8.8 | Same area. |
| 6-12-74 | 10 min. Continuous | 6.7 | Making rounds and at purification desk |
| 7-16-74 | 10 MIN. CONTINUOUS | 11.0 | SAME AREA |
| 7-17-74 | 10 min. Continuous | 122.8 | Purification Bldg. and Tank farm area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Jack Gillespie | 5-16-57 | 0701 | Centrifuge Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 3.5 | Line 8 Bagger (Relief) |
| 5-3-74 | 10 min. continuous | 4.3 | Line 8 Bagger. Type 605. |
| 6-11-74 | 10 min. Continuous | 0.7 | Bagging 6411 at Line 6. |
| 6-13-74 | 10 min. Continuous | 4.8 | Bagging 654 at Line 8. |
| 7-17-74 | 10 min. Continuous | 2.8 | Line 6 Bagger, Type 605. |
| 7-19-74 | 10 min. Continuous | 0.3 | Line 8 Bagger, Type 654 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| R. S. Gincley | 12-27-66 | 7858 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 15 | Bldg II, Walked around his work area for 10 min. |
| 4-30-74 | 10 min. Continuous | 12 | Cleaning strainer on Reactor #70 and strainer on 100 homogenizer. |
| 5-8-74 | 10 min. Continuous | 60 | Installing drop valve on R #72, Reactor was not aired out. |
| 5-13-74 | 10 min. continuous | 21 | Pipefitter Changing relief valve on R #34. |
| 5-16-74 | 10 min. Continuous | 10.6 | Changing relief valve on R #32. |
| 6-10-74 | 10 min. Continuous | 10.5 | Bldg. II, Reactor Room. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| J. Glutz | 11-29-56 | 3466 | Janitorial |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-3-74 | 10 min. continuous | 1.2 | Sweeping on 2nd Floor Line 6 area. |
| 7-18-74 | 10 min. Continuous | 9.4 | Washing down Mezz. Bldg. I |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Joseph J. Gnias | 6-15-48 | 5503 | Trucker |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 5.0 | Trucker, Moving 654 skids in Warehouse. |
| 6-13-74 | 10 min. Continuous | 7.8 | Moving 654 skids in Warehouse. |
| 7-15-74 | 10 min. continuous | 0.7 | Loading 605 into tractor trailor. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Louis S. Godek | 9-8-64 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-10-74 | 10 min. Continuous | 6.8 | Lab Technician Gas checking tank car for gumdip usage. |
| 5-14-74 | 10 min. Continuous | 3.8 | Lab Technician In Rubber Lab and Bldg. I, Relief Area. |
| 6-7-74 | 4 hr. TWA | 2.6 | Latex Lab. sample man |
| 7-18-74 | 10 min. Continuous | 6.5 | Rubber Lab. |
| 8-8-74 | 10 min. Continuous | 1.4 | In Rubber Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Abner C. Good | 9-21-64 | 6014 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | <0.5 | Sheet Metal Worker, On Roof - Bldg. II with Nash pumps off. |
| 5-5-74 | 10 min. Continuous | 26.5 | Bldg. II, Reactor Level, Lower Mezz. Installing duct work. Century = 25 P.P.M. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William H. Goodwin, Jr. | 5-29-46 | 5682 | Tank Farm |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 21 | Tank Farm Attendant, in Purification Bldg. Moved thru all areas. Century = 12-25 P.P.M. |
| 5-1-74 | 10 min. Continuous | 10.8 | In Purification Bldg. |
| 5-15-74 | 10 min. continuous | 62.4 | In Purification Bldg. Bled down recycle ViCl pump with mask on but did not turn air pump off. |
| 6-4-74 | 4 hr. TWA | 9.4 | Tank Farm Operator |
| 6-10-74 | 10 min. Continuous | 15.0 | In Purification Bldg. Century = 15 P.P.M. |
| 6-14-74 | 10 min. continuous | 17.5 | In Purification Bldg. |
| 7-15-74 | 10 min. continuous | 6.2 | Started B.D. Pure. Unit & Started unloading 2 ViCl Tk. cars. |
| 7-18-74 | 10 min. Continuous | 37.0 | In Purification area. Found 2nd stage valve on oil col. comp. leaking F.M. |
| 7-26-74 | 10 min. Continuous | 55.0 | At desk in Purification house. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Irvin H. Gougler | 4-23-46 | 3603 | Relief Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 100 | Relief Oper., Bldg. II. Pumping out 6411 heel. Str. #12. No mask. |
| 4-30-74 | 10 min. Continuous | 5.2 | Bldg. II, Opened and cleaned pot strainer under Str. #11 after a 9282 batch. |
| 5-2-74 | 10 min. Continuous | 44.0 | Bldg. II, Pumping out 605 heel from Str. #16. |
| 5-9-74 | 10 min. Continuous | 14.0 | Bldg. II, Stripper Operator. Pumping Str. #11, Type 9300. |
| 5-11-74 | 10 min. continuous | 13.0 | Bldg. II Stripper Oper. pumping stripper 17 thru filter pot. |
| 5-13-74 | 8 Hr. | 25.8 | Bldg. II Relief Operator |
| 5-14-74 | 10 min. continuous | 5.8 | Bldg. II Relief Operator |
| 6-12-74 | 10 min. Continuous | 66.0 | Bldg. II, Relief Oper. Found maint. working on R #60 D.V. had air going into top of Reactor. Smelled VCM, foreman notified to pull reactor with evac. line during this oper. |
| 6-25-74 | 4 hr. Periodic | 33 | Same area. |
| 7-10-74 | 10 MIN. CONTINUOUS | 6.2 | BLDG. 2 RELIEF AREA |
| 7-18-74 | 10 min. Continuous | 17.2 | Bldg. II Relief. |
| 8-12-74A | 10 min. Continuous | 2.2 | Bldg. I Relief |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| George C. Crampp | 2-13-62 | 3642 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-22-74 | 10 min. Continuous | 1.8 | Desk by Rotary Dryer control panel. Century = 7 P.P.M. |
| 4-30-74 | 10 min. Continuous | 70.5 | Bldg. II, inside R #43 cleaning with hammer and chisel. Century & manhead = 40-50 P.P.M. |
| 5-3-74 | 10 min. continuous | 1.2 | Line 3 palletizer. Type 654. |
| 5-4-74 | 10 min. Continuous | 3.6 | Bulk area. Control Panel for Rotary Dryers. |
| 5-8-74 | 10 min. Continuous | 6.0 | Bldg. II, Reactor Level, using Sugino in R #74. Century = 30 P.P.M. |
| 5-9-74 | 10 min. Continuous | 12.0 | Same area. Using Sugino in R #73. Century = 45 P.P.M. |
| 5-10-74 | 10 min. Continuous | 19.0 | Same area. Using Woma Gun in R #55. Century = 25 P.P.M. |
| 5-12-74 | 10 min. Continuous | 4.0 | Bulk Area Control Panel |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John R. Crator | 11-18-46 | 2454 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 5 | Dryer Oper., Line 3, Stacking 605. |
| 5-2-74 | 10 min. Continuous | 12.8 | Line 3, Palletizing 605. |
| 5-4-74 | 10 min. continuous | 0.5 | Bagging 654 on Line 3. |
| 5-12-74 | 10 min. Continuous | 2.4 | Bagging 6366 on Line 3. |
| 6-5-74 | 4 hr. TWA | 1.8 | Line 3 Bagger and Stacker. |
| 6-12-74 | 10 min. Continuous | 1.5 | Saddle Bagger, Line 3, 654. |
| 7-15-74 | 10 min. continuous | 0.5 | Saddlebagger Line 3, 654 |
| 8-11-74A | 10 min. Continuous | 2.9 | Bagging 605 on 3 line. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Theodore Gribb, Jr. | 6-10-74 | 1463 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-15-74 | 10 min. continuous | 35 | Cleaning up Bldg. II, Stripper Level Area, under Reactors #34 & #35. |
| 7-16-74 | 10 min. continuous | 0.1 | Cleaning Mezz. on Line 8, walked through Warehouse. |
| 7-18-74 | 10 min. Continuous | 1.2 | Cleaning Railroad car in unloading Bldg. |
| 8-12-74C | 10 min. Continuous | 0.2 | Bagging 454 Line 13. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Al Gritte | 6-9-52 | Salary | Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-19-74 | 10 min. Continuous | 0.2 | Engineers Offices. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William Gromalski | 5-25-62 | 2953 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. continuous | 78 | Did normal work - 1:05 a.m. made sweep with Century 40: |
| 4-27-74 | 10 min. continuous | 60 | 3:45 a.m. purging a reactor and doing normal work - see Century report. |
| 4-28-74 | 10 min. continuous | 23 | Charging Reactor 70 |
| 5-1-74 | 10 min. Continuous | 27 | Charging R #60 VC going in. |
| 5-2-74 | 10 min. Continuous | 24 | Checking reactors Century 35 |
| 5-5-74 | 10 min. Continuous | 13 | Charging 654 to reactor 60. |
| 5-7-74 | 7 Hrs. TWA | 16 | |
| 5-11-74 | 10 min. Continuous | 12.2 | Charging R #60 |
| 5-12-74 | 10 min. Continuous | 22 | Charging R #60 |
| 5-13-74 | 10 min. continuous | 28.5 | Charging R #70. |
| 5-14-74 | 10 min. continuous | 45 | Transferring a batch. |
| 5-15-74 | 10 MIN. CONTINOUS | 19 | CHARGING R #60 |
| 5-16-74 | 10 min. continuous | 12.1 | Charging R #60 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William Gromalski | 5-25-62 | 2953 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 6-10-74 | 10 min. Continuous | 15.5 | Bldg. II, R.R. |
| 7-16-74 | 10 min. continuous | 14.9 | Charging Vessel #70 & Reactor #67. |
| 7-17-74 | 10 min. Continuous | 7.4 | Charging R #75 |
| 8-11-74C | 10 min. Continuous | 12.9 | Charging R #60 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Glenn Grow | 10-1-71 | Salary | Process Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-9-74 | 10 min. Continuous | 20.1 | Bldg. II, Reactor Room. Getting Century readings from 25-100 P.P.M. Apparently sucking from roof. |
| 6-14-74 | 10 min. continuous | 19.5 | Red Rust Spray |
| 7-17-74 | 10 min. Continuous | 15.0 | Hauling hose from under Bl. Tks. to Bldg. II |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Louis Haberle | 5-18-50 | 5516 | Stripper Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 78 | Was near sample station when Reactor 6 was sampled. |
| 4-29-74 | 10 min. continuous | 6.2 | Was attempting to drop Reactor 22, but drop line was plugged. |
| 5-1-74 | 10 min. Continuous | 82 | Dropping and sampling R #20. Century reading as high as 0.3% when sampling (FPC-9300) |
| 5-5-74 | 10 min. Continuous | 82.5 | Dropping and sampling R #20, FPC-9300 |
| 5-11-74 | 10 min. Continuous | 3.0 | Dropping R #21 used mask to sample |
| 5-12-74 | 10 min. Continuous | 7.6 | In Reactor Room and Stripper Level. |
| 5-13-74 | 7-8 Hrs. TWA | 21 | |
| 5-14-74 | 10 min. continuous | 3.9 | Bldg. I Stripper Level |
| 6-11-74 | 10 min. Continuous | 6.2 | Bldg. I Stripper level and R.R. |
| 6-14-74 | 10 min. Continuous | 5.9 | Stripper level and Reactor Room, Bldg. I |
| 7-15-74 | 10 MIN. CONTINUOUS | 26 | STRIPPER LEVEL BLDG. 1 |
| 7-16-74 | 10 min. Continuous | 20 | Stripper Level, Bldg #1. |
| 7-18-74 | 10 min. Continuous | 31.0 | Stripper level, Bldg. I. |

| | | | |
|---|---|---|---|
| Louis Haberle | 5-18-50 | | 5516 |
| 8-11-74C | 10 min. Continuous | 4.9 | Bldg. I Stripper Operator |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| P. B. Hains | 5-8-73 | 8814 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. Continuous | 0.1 | Mechanic Tin-Carpenter Shop |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| George Lane | 6-15-51 | 5547 | Stripper Operator |

| EXPOSURE DATE | TWA DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 6 | Walked around his work area for 10 min. |
| 4-28-74 | 10 min. Continuous | 14 | Dropping Reactor 43. |
| 5-1-74 | 10 min. Continuous | 18 | Sampled R #33, FPC-9202. |
| 5-3-74 | 10 min. continuous | 25 | Dropping reactor 34 and 47. |
| 5-5-74 | 10 min. Continuous | 19 | At desk on stripper level and in reactor room. |
| 5-8-74 | 10 min. Continuous | 12.1 | Sampled and dropped R #34, FPC-965. |
| 5-9-74 | 7-8 Hrs. TWA | 44 | |
| 5-13-74 | 10 min. continuous | 116 | Reactor Room and Stripper Level dropping R #42 (Century 15-40). He was following me around with Century while getting hi readings 150-200 coming in windows. (Put windows back in.) |
| 5-14-74 | 10 min. continuous | 18 | Dropping R34. |
| 6-10-74 | 10 min. Continuous | 6.4 | Stripper and Reactor Level Bldg. II |
| 7-15-74 | 10 MIN. CONTINUOUS | 16 | STRIPPER LEVEL, BLDG. 2 |
| 7-17-74 | 10 min. Continuous | 4.7 | By desk. |
| 7-18-74 | 10 min. Continuous | 1.7 | Bldg. II, Stripper level. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Raymond Harp, Jr. | 5-30-74 | 1445 | Service and Utility (Temporary Personnel) |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 6-12-74 | 10 min. Continuous | 2.4 | Cleaning out saddle bagger. |
| 7-16-74 | 10 min. Continuous | 2.4 | Bagging on 11 Line |
| 7-18-74 | 10 min. Continuous | 0.1 | Bagging on 4 line. |
| 8-12-74C | 10 min. Continuous | 3.9 | Cleaning on Bldg. I stripper level PVC side. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Ken Harris | 10-13-59 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 6-13-74 | 10 min. Continuous | 6.5 | Senior Tech. In Lab. milling fish |
| 7-18-74 | 10 min. Continuous | 5.8 | Bldg. I, Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| James J. Hartman | 5-21-62 | 0046 | Stripper Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 1.5 | Plastisol Stripper level dropped Stripper 13, Type 6337 Century = 15 P.P.M. |
| 4-28-74 | 10 min. Continuous | 20.0 | Bldg. II, Stripper level Century = 18 C PVC Desk |
| 4-30-74 | 10 min. Continuous | 6.4 | Bldg. II, Stripper Level Century = 10 P.P.M. |
| 5-1-74 | 10 min. Continuous | 6.0 | Same area. Century = 15 P.P.M. |
| 5-2-74 | 10 min. Continuous | 3.6 | Same Area. Century = 12 P.P.M. |
| 5-3-74 | 10 min. continuous | 4.6 | Same area. Century = 7 P.P.M. |
| 5-4-74 | 10 min. Continuous | 3.4 | Same area. Century = 8 P.P.M. |
| 5-5-74 | 10 min. Continuous | 6.3 | Same area. Century = 10 P.P.M. |
| 5-6-74 | 10 min. Continuous | 3.3 | Same area, Century = 10 P.P.M. |
| 5-8-74 | 10 min. Continuous | 2.0 | Same area. Century = 12 P.P.M. |
| 5-9-74 | 10 min. Continuous | 2.1 | Same area. Century = 10 P.P.M. |
| 5-10-74 | 10 min. Continuous | 8.4 | Same area. Century = 8 P.P.M. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| James J. Hartman | 5-21-62 | 0046 | Stripper Operator<br>Hi Press Flush |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-12-74 | 10 min. Continuous | 29.0 | Bldg. II, Stripper Level. Century = 8 P.P.M. |
| 5-13-74 | 10 min. Continuous | 6.0 | Same area. Century = 15 P.P.M. |
| 5-14-74 | 10 min. Continuous | 9.6 | Same area. Century = 10 P.P.M. |
| 5-15-74 | 10 MIN. CONTINOUS | 2.5 | SAME AREA. CENTURY = 12 P.P.M. |
| 5-16-74 | 10 min. Continuous | 17.0 | Bldg. II, Reactor Level using Sugino in R #61 and 71. |
| 5-17-74 | 10 min. continuous | 10.0 | Same area, low pressure $H_2O$. Flushing R-42. |
| 7-16-74 | 10 MIN. CONTINUOUS | 31.0 | BLDG 2 REACTOR LEVEL |
| 7-17-74 | 10 min. Continuous | 8.4 | Bldg. II, Reactor level. |
| 7-19-74 | 10 min. Continuous | 27.0 | Bldg. II, Reactor area. |
| 8-1-74 | 10 min. continuous | 15.0 | Unplugging Drop Valve R#40 after 6366 batch. |
| 8-12-74B | 10 min. Continuous | 13.3 | Flushing R #52 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| George Harvey | 10-17-60 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 4.0 | Lab. Technician Taken in Mill Room Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Leo J. Harvey | 1-9-53 | 5523 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 6.0 | Bldg. I, PVC Reactor Level. Charging R #12 type 4301 Century = 20.0 P.P.M. |
| 4-29-74 | 10 min. Continuous | 10.4 | Bldg. I, PVC Reactor Level. Charging R #2, Type 450 and R #8, Type 4296. Century = 25-30 P.P.M. |
| 4-30-74 | 10 min. Continuous | 11.9 | Bldg. I, PVC Charge Area Century = 20 P.P.M. |
| 5-1-74 | 10 min. Continuous | 7.0 | Same area, Charging R #61, Type 9300. Century = 15 P.P.M. |
| 5-2-74 | 10 min. Continuous | 15.0 | Same area, (4) Reactors opened to be flushed. Charging R #8, Type 9300. Century = 25 P.P.M. |
| 5-3-74 | 10 min. continuous | 8.8 | Same area. Charging Reactors 1 and 3. Types 450 and 454. Century = 20 P.P.M. |
| 5-5-74 | 10 min. Continuous | 5.6 | Same area. Charging R #11, Type 9300. Century = 15 P.P.M. |
| 5-6-74 | 10 min. Continuous | 6.6 | Same area. Century = 15 P.P.M. |
| 5-8-74 | 8 Hr. Periodic | 12.0 | Same area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Leo J. Harvey | 1-9-53 | 5523 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-9-74 | 10 min. Continuous | 16.0 | Bldg. I, PVC Reactor Level. Century = 25 P.P.M. |
| 5-10-74 | 10 min. Continuous | 47.0 | Same area. Charging R #13, Type 9300. Six open reactors and complaints that the strippers were not palling long enough on reactors before opening. Century = 40 P.P.M. |
| 5-12-74 | 10 min. Continuous | 16.0 | Same area. |
| 5-13-74 | 10 min. Continuous | 204 | Same area, 4 Reactors opened to flush. Century = 250 P.P.M. |
| 5-13-74 | 10 min. Continuous | 7.0 | Same area. Charging R #12, Type 9290. |
| 5-14-74 | 10 min. Continuous | 8.4 | Bldg. I, PVC Reactor level. Charging R #3, Type 499. Century = 15 |
| 5-15-74 | 10 MIN. CONTINOUS | 6.7 | SAME AREA. CHARGING R #4, TYPE 454. CENTURY = 15 P.P.M. |
| 5-16-74 | 10 min. Continuous | 10.4 | Same area. Charging R #2, Type 454. |
| 5-17-74 | 10 min. continuous | 15.1 | Same area. Charging R-2 Type 450. |
| 6-4-74 | 4 hr. TWA | 2.6 | Bldg. I, PVC Charging |
| 6-10-74 | 10 min. Continuous | 10.8 | Bldg. I R.R. |
| 7-16-74 | 10 MIN. CONTINUOUS | 34.5 | SAME AREA |

| | | | |
|---|---|---|---|
| Leo J. Harvey | | 1-9-53 | 5523 |
| 7-17-74 | 10 min. Continuous | 17.5 | Bldg. I, PVC Reactor level. |
| 8-12-74 | 10 min. Continuous | 5.9 | In Warehouse. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John Harwell | 11-23-64 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 1 | Lab. Technician. Taken while milling one sheet 6337, 654 and 4414. |
| 5-4-74 | 10 min. continuous | Trace | Finished testing job in Resin Lab. |
| 5-11-74 | 10 min. continuous | 7.6 | Resin Plant Lab. Mill man. |
| 6-7-74 | 4 hr. TWA | 6.5 | Millman Chem. Plt. Lab. |
| 6-12-74 | 10 min. Continuous | 0.05 | Mill man , Chem. Plt. Lab. |
| 7-16-74 | 10 min. continuous | 0.15 | Millman Chem. Plt. Lab |
| 8-12-74A | 10 min. Continuous | 0.6 | Milling PVC in Resin Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Gerald T. Hemmig | 5-4-51 | 5657 | Senior Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 3.5 | Pumping out Stripper #6 Butd. Heel. Century = 20 P.P.M. |
| 4-28-74 | 10 min. Continuous | 12.1 | H.P. Clean, not working at time of test, in Bldg. II reactor level. @ 53 Reactor Bank |
| 5-1-74 | 10 min. Continuous | 3.4 | Bldg. II, Stripper Level Plast. dropping R #62, Type 605. Century = 15 P.P.M. |
| 5-2-74 | 10 min. Continuous | 69 | Bldg. II, Reactor Level R #60-70 Bank around Reactors while flushing. Century = 35 P.P.M. |
| 5-3-74 | 10 min. Continuous | 209 | Same area. Flushing R #43 & 53 with H.P. water hose. Century = 150 P.P.M. |
| 5-4-74 | 10 min. Continuous | 4.4 | Bldg. I, Reactor Operator, Charging R #10, Type 9300. Century = 20 P.P.M. |
| 5-5-74 | 10 min. Continuous | 1310 | Bldg. II, Flushing R #50 with H.P. water hose when chunk plugged drop valve and vinyl vapors came out top of reactor. |
| 5-6-74 | 10 min. Continuous | 15.1 | Bldg. II, Reactor Operator. Century = 30 P.P.M. |
| 5-8-74 | 10 min. Continuous | 15.0 | Same area. Charging R #44, Type 6366. Century = 20 P.P.M. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Gerald T. Hemmig | 5-4-51 | 5657 | Senior Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-9-74 | 10 min. Continuous | 30.0 | Bldg.II, Reactor Operator. Charging R #49, Type 6366. Century = 30 P.P.M. |
| 5-10-74 | 10 min. Continuous | 24.0 | Same area. Charging R #53, Type 6338. Century = 25 P.P.M. |
| 5-13-74 | 10 min. Continuous | 310 | Bldg. II, using Sugino in R #64 & 72. While in R #72 drop line appeared to have plugged since vinyl vapors could be seen coming out of suction tube on Sugino head even though ventilating fan was operating. Century = 10,000 P.P.M.'s @ Sugino. |
| 5-14-74 | 10 min. Continuous | 14.0 | Same area, using Sugino in R #61 & 71. Century = 15 P.P.M. |
| 5-15-74 | 10 MIN. CONTINOUS | 3.9 | SAME AREA USING SUGINO IN R #72. CENTURY = 15 P.P.M. |
| 5-16-74 | 10 min. Continuous | 40.1 | Same area, although stripper for PVC area Bldg. II. |
| 5-17-74 | 10 min. continuous | 23.1 | Bldg. II stripper PVC area and reactor level. |
| 6-11-74 | 10 min. Continuous | 25.5 | Hi press. flusher - assisting McCarthy on R #56 - McCarthy 666 as drop valve plugged. Century up to 500. |
| 7-16-74 | 10 MIN. CONTINUOUS | 21.0 | BLDG. 2 STRIPPER LEVEL PLASTISOL SIDE |
| 7-18-74 | 10 min. Continuous | 4.6 | Bldg. II, Reactor and Stripper levels. |
| 7-19-74 | 10 min. Continuous | 10.5 | Bldg. II, Reactor Area. |

| | | | | |
|---|---|---|---|---|
| Gerald T. Hemmig | 5-4-51 | | 5657 | |
| 8-12-74B | 10 min.<br>Continuous | 49.0 | Charging R #35 leaking valve at 38 charge vessel. | |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| L. M. Heyot | 3-20-72 | 5938 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-30-74 | 10 min. Continuous | 17.2 | Oiler, working in reactor room Bldg. II - R #60-70 bank. |
| 5-4-74 | 10 min. Continuous | 3.9 | Bldg. I, PVC Stripper area. |
| 6-10-74 | 10 min. Continuous | 6.5 | Pulling Seal R #4. |
| 6-14-74 | 10 min. continuous | 4.2 | Bldg. II area. |
| 7-16-74 | 10 min. continuous | 1.2 | Oiler, grinder rooms, deionized water pump, Bldg. I, pump-out. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Eugene L. Hildebrand | 5-7-50 | 5543 | Supplies |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 16.0 | Upper Mezz. making up sol'ns in Bldg. II |
| 4-28-74 | 10 min. Continuous | 13.3 | Bldg. II, Upper Mezz, making up CD-2085 sol'ns. Century = 25 P.P.M. |
| 5-1-74 | 10 min. Continuous | 16.9 | Bldg. I, Lower Mezz. Century = 15.0 P.P.M. |
| 5-2-74 | 10 min. Continuous | 5.5 | Bldg. I, Mezz. (PVC_E Century = 15.0 P.P.M. |
| 5-4-74 | 10 min. Continuous | 9.0 | Bldg. I, Upper Mezz. making up CD-2085 sol'n. Century = 20 |
| 5-13-74 | 10 min. Continuous | 15.5 | Bldg. II Upper Mezz. making up CD-2085 sol'n. Century = 20 P.P.M. |
| 5-14-74 | 10 min. Continuous | 14.0 | Same area making CD-2085 sol'n. Century = 20 P.P.M. |
| 5-15-74 | 8 Hr. Periodic | 3.1 | Bldg. I & II making sol'n. |
| 5-16-74 | 10 min. Continuous | 7.7 | Bldg. I, Reactor Level Mezz. |
| 5-17-74 | 10 min. continuous | 6.7 | Bldg. II reactor level upper Mezz. making sipex solution. |
| 6-4-74 | 4 hr. TWA | 6.3 | Supply man |
| 7-16-74 | 10 MIN. CONTINUOUS | 2.7 | BLDG 1 & 2 MEZZ. LEVELS |
| 7-17-74 | 10 min. Continuous | 6.3 | Bldg. II, Upper Mezz. level. Making CD-2085 soldn |

| | | | |
|---|---|---|---|
| Eugene Hildebrand | | 5-7-50 | 5543 |
| 7-19-74 | 10 min. Continuous | 5.0 | Bldg. I, Mezz. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| James Hillibush | 4-5-47 | 5623 | Relief Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 1 | Bldg. I, Walked around his work area for 10 min. |
| 5-1-74 | 10 min. Continuous | 3.8 | Draining Bldg. I K/O tanks Century = 15 P.P.M. |
| 5-8-74 | 10 min. Continuous | 7.2 | Pumping out Stripper #3 reactor flushings going in drum. |
| 5-10-74 | 7-8 Hr. TWA | 4.5 | Relief area, Bldg. I |
| 5-12-74 | 10 min. Continuous | 10.4 | Pumping out #1 Stripper. |
| 6-13-74 | 10 min. Continuous | 3.2 | Bldg. I pumpout. |
| 7-16-74 | 10 min. continuous | 23.0 | Bldg. I Pumpout. |
| 7-18-74 | 10 min. Continuous | 13.3 | Bldg. I, Pumpout by desk. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John Hilt | 7-3-61 | Salary | Plant Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-30-74 | 10 min. Continuous | 1.8 | In Sipex Storage Room, Bldg. II |
| 6-14-74 | 10 min. continuous | 1.9 | Office |
| 7-16-74 | 10 min. continuous | 12.3 | Checking Homogenizers 2nd & 3rd Flrs Bldg. II |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Klaus Hochschwender | 3-16-49 | Salary | Division Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 6-12-74 | 10 min. Continuous | 0.05 | In engineering offices. |
| 7-19-74 | 10 min. Continuous | 0.8 | Engineers Offices. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| James E. Howard | 6-6-73 | 8889 | Bagger |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 1.1 | Line 13, Bagger, Type 454 Century = 6.5 P.P.M. |
| 7-17-74 | 10 min. Continuous | 0.1 | Bagging on 12 Line. |
| 7-18-74 | 10 min. Continuous | 0.1 | Redry on 5 Line. |
| 8-11-74C | 10 min. Continuous | 1.6 | Bagger-Saddle bagging 9290 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Walter Hunsberger | 10-10-47 | 5549 | Stripper Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. continuous | 135 | Dropping & sampled reactor 6 |
| 4-27-74 | 10 min. continuous | 5 | Dropping & sampled 2 batches with 0 psig in them. |
| 5-5-74 | 10 min. Continuous | 8.1 | Dropped and sampled an FPC-454 batch from R #4. |
| 5-9-74 | 10 min. Continuous | 153 | Dropping and sampling R #3, FPC-9300. Century after sampling up to 0.07% at sampling station. |
| 5-12-74 | 7-8 Hr. TWA | 8.1 | |
| 5-14-74 | 10 min. continuous | 25 | Dropping and sampling R14 used Mash to sample, but pump was running. |
| 5-15-74 | 10 MIN. CONTINOUS | 10.2 | STRIPPING & REACTOR AREAS. |
| 6-11-74 | 10 min. Continuous | 29.5 | Bldg. I, Stripper level. |
| 7-15-74 | 10 min. continuous | 5.3 | Bldg. I, Stripper Level, By Desk |
| 7-16-74 | 10 min. Continuous | 24.0 | Bldg. I Stripper level. |
| 7-18-74 | 10 min. Continuous | 31.0 | Stripper level, Bldg. I |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| David Hunsburger | 5-20-74 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-15-74 | 10 min. continuous | 4.0 | Picking up samples on Lines 3, 4, 6. |
| 8-11-74C | 10 min. Continuous | 8.4 | Plastisol testing in Plastisol Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| David Hunsburger | 5-20-74 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-15-74 | 10 min. continuous | 4.0 | Picking up samples on Lines 3, 4, 6. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Edward Hydock | 10-17-46 | Salary | Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-13-74 | 10 min. continuous | 1.8 | Making tour of Warehouse. |
| 6-13-74 | 10 min. Continuous | 2.0 | Making tour of warehouse. |
| 7-19-74 | 10 min. Continuous | 0.5 | Shipping Office. |
| 8-12-74 | 10 min. Continuous | 1.1 | In Shipping Offices. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| C. A. Janiszewski | 1-20-69 | 9645 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 1.0 | Pipefitter. Repairing Homo Stripper Level, Bldg. II. Century = 15 P.P.M. |
| 5-2-74 | 10 min. Continuous | 3.8 | Replacing manhole cover on S #4, Bldg. I. Century = 15 P.P.M. |
| 5-4-74 | 10 min. Continuous | 17.5 | Bldg. I, PVC Stripper Level installing valve. Century = 25 P.P.M. |
| 5-13-74 | 10 min. Continuous | 9.9 | Bldg. I, Buta. reactor area. Century = 15 P.P.M. |
| 5-14-74 | 10 min. Continuous | 24.0 | Bldg. I, Buta. Stripper and Reactor areas. |
| 5-15-74 | 8 Hr. Periodic | 33.0 | Bldg. I, Reactor Level. |
| 5-16-74 | 10 min. Continuous | 3.1 | Bldg. I, PVC Stripper area. |
| 5-17-74 | 10 min. continuous | 7.4 | Bldg. I PVC Reactor Area putting blank in R-11 charge line. |
| 6-11-74 | 10 min. Continuous | 9.2 | Blanking out R #9 for cleaning. |
| 6-14-74 | 10 min. Continuous | 13.8 | Putting "Bemol" on R #23 head and in Reactor room, Bldg. I |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| E. B. Jenschke | 10-26-49 | Salary | Plant Engineering |

| DATE TESTED | TEST DURATION | P.P.M. | CONTENTS |
|---|---|---|---|
| 5-8-74 | 10 min. Continuous | 8.1 | Plant Engineering Touring Bldg II, Reactor Room with Boiler Inspector. |
| 6-12-74 | 10 min. Continuous | 0.05 | Engineering offices. |
| 7-19-74 | 10 min. Continuous | 0.2 | Engineers Offices. |
| 8-12-74 | 10 min. Continuous | 0.2 | Locker Room to Eng. offices. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Edward Johnson | 8-3-59 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 1 | Lab. Supervisor In Resin Lab. and Office. |
| 5-1-74 | 10 min. continuous | 2.5 | Bldg. I, at relief operator's desk. |
| 5-12-74 | 10 min. Continuous | 3.4 | Lab. Mill Room. |
| 5-14-74 | 10 min. continuous | 3.1 | Lab Supervisor From Rubber Lab to Resin Lab. |
| 5-15-74 | 10 min. continuous | 0.8 | In Resin Lab |
| 6-10-74 | 10 min. Continuous | 15.0 | Making rounds of Bldg. II. |
| 6-14-74 | 10 min. continuous | 0.9 | In Lab |
| 7-16-74 | 10 min. continuous | 0.4 | Lab Mill Room |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Ralph H. Johnson | 7-26-50 | 5600 | Trucker |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. continuous | 0.5 | Linetrucker |
| 5-15-74 | 10 min. continuous | 2.4 | Trucking in Bulk Area |
| 5-17-74 | 10 min. continuous | 26.4 | Trucking from dryer lines to weigh scales. |
| 6-13-74 | 10 min. Continuous | 2.6 | Trucking from Dryer lines to weigh scales. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Paul J. Jones | 6-12-62 | 3836 | Janitor |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-11-74 | 10 min. continuous | 10.3 | Cleaning in stripper level Bldg. II |
| 6-14-74 | 10 min. continuous | 4.3 | Cleaning |
| 7-19-74 | 10 min. Continuous | 0.7 | In Tower at Bulk area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Kenneth Keiser | 6-19-74 | 1497 | Temporary Personnel |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-18-74 | 10 min. Continuous | 1.3 | Warehouse loading trailer. |
| 8-12-74B | 10 min. Continuous | 21.0 | Top of Reactor 57, while buddy was cleaning. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Kaye W. Keiter | 5-17-62 | 4782 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 3.5 | Line 4 Bagger |
| 4-28-74 | 10 min. Continuous | 6.2 | Line 4 Bagger, Type 6337 |
| 5-3-74 | 10 min. continuous | 0.5 | Line 4 Bagger, Type 6338. |
| 6-11-74 | 10 min. Continuous | 1.1 | Bagging 6337 at Line 4. |
| 6-13-74 | 10 min. Continuous | 1.8 | Bagging 6337 at Line 4. |
| 7-19-74 | 10 min. Continuous | 0.7 | Line 4 Bagger, Type 6338 |
| 8-12-74B | 10 min. Continuous | 1.0 | Cleaning R #57. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Francis J. Kelly | 4-15-47 | 5576 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 2.3 | Dryer Oper., Line 8 Bagger, 654 |
| 5-13-74 | 10 min. continuous | 0.9 | Bagging 654 on Line 8 |
| 6-5-74 | 4 hr. TWA | 3.2 | Bagging 654 Line 8 |
| 6-12-74 | 10 min. Continuous | 4.7 | Bagging 605, Line 8. |
| 7-19-74 | 10 min. Continuous | 0.3 | Bagging at Line 8. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| C. Kepner | 7-12-63 | 2678 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. Continuous | 0.6 | Palletizer, Line 3 Century = 7.0 P.P.M. |
| 5-4-74 | 10 min. Continuous | 1.4 | Palletizer, Line 3 Century = 7.0 P.P.M. |
| 6-11-74 | 10 min. Continuous | 6.9 | Bagging 6411, Line 6. |
| 6-14-74 | 10 min. Continuous | 16.2 | Bagging 654, Line 6. |
| 7-15-74 | 10 min. continuous | < 1.0 | Starting up Line 3. |
| 7-18-74 | 10 min. Continuous | 7.5 | Bagging on Line 3. |
| 8-11-74C | 10 min. Continuous | 1.7 | Bagging L-3 (605) |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Charles Kilpatrick | 5-24-62 | 4782 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 1 | Bagged at Line 4 |
| 4-28-74 | 10 min. Continuous | 2 | Bagged at Line 4 |
| 5-3-74 | 10 min. continuous | 1.1 | Bagging 6338 on Line 4. |
| 5-7-74 | 10 min. Continuous | 0.4 | Bagging 654 at Line 4. |
| 5-12-74 | 10 min. Continuous | 0.3 | Bagging 6338 at Line 4. |
| 5-15-74 | 10 MIN. CONTINOUS | 1.0 | BAGGING 6337 AT LINE 4. |
| 6-12-74 | 10 min. Continuous | 0.2 | Bagging 6337 at Line 4. |
| 7-17-74 | 10 min. Continuous | 2.7 | Bagging on Line 4. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| C. R. Kimes | 8-13-51 | 8591 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. Continuous | 18 | Instrument Man, Bldg. II. Checking water meter Plastisol Banks 60 & 70. Century = 25 P.P.M. |
| 5-17-74 | 10 min. continuous | 51.2 | Bldg. II, Reactor Room working on instruments @ panel board R #55. Oper. Notif. |
| 6-14-74 | 10 min. continuous | 3.1 | Bldg. II pump ring. |
| 7-15-74 | 10 min. continuous | 0.2 | Calibrating Temp. Recorder Line 3 |
| 8-9-74 | 10 min. Continuous | 4.4 | Working under Str. #11 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Joseph King | 4-13-64 | Salary | Enviromental Engineer |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-1-74 | 10 min. continuous | 6.0 | Taken while performing operator's job at effluent solids recovery. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| WILLIAM KNIGHT | 9/25/67 | SALARY | LAB. |

| DATE TESTED | TEST DURATION | P. P. M. | COMMENTS |
|---|---|---|---|
| 7-15-74 | 10 MIN. CONTINUOUS | 1.5 | COLLECTING RESIN FROM DRYER LINES |
| 7-18-74 | 10 min. continuous | 1.2 | Lab. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Allen Koch | 9-2-69 | 9954 | Dryer Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 9 | Bagging Line 6 - Door to BTS. closed. |
| 4-29-74 | 10 min. continuous | 15 | Bagging on Line 6 |
| 5-3-74 | 10 min. continuous | 4.8 | Bagging 6411 on Line 6 |
| 5-16-74 | 10 min. continuous | 31 | Bagging 6411 at line 6 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John L. Kochel | 1-22-53 | 5567 | Trucker |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 7.5 | Line Trucker |
| 5-4-74 | 10 min. continuous | 0.5 | Line Trucker |
| 5-13-74 | 10 min. continuous | 0.3 | Line Trucker Pressing Pallets |
| 6-5-74 | 4 hr. TWA | 1.5 | Trucking |
| 6-12-74 | 10 min. Continuous | 5.0 | Trucking, Line 7 and 8. |
| 8-12-74A | 10 min. Continuous | 2.1 | Trucking between Line 3 and Warehouse |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| J. D. Kodack | 1-2-74 | 9500 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. Continuous | 0.0 | Combination Welder In Welding Area. |
| 8-12-74 | 10 min. Continuous | 2.3 | Fabricating pipe in Weld Shop. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Jack L. Koehler | 1-23-67 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-12-74 | 10 min. Continuous | 4.6 | Lab. Technician, Check Viscosities. |
| 6-12-74 | 10 min. Continuous | 21.0 | Checking viscosities in Lab. |
| 6-14-74 | 10 min. Continuous | 425.0 | In Lab. at rel. viscosity batch - no explanation. |
| 7-16-74 | 10 MIN. CONTINUOUS | 1.6 | BUILDING 1 LAB. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| L. Kollar | 4-27-64 | 5728 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 3.4 | Mechanic In Mechanics Shop replacing seal on pump. |
| 6-14-74 | 10 min. continuous | 2.7 | Six Sugino nozzle. |
| 8-12-74A | 10 min. Continuous | 4.4 | Bldg. II Relief area. Working on comp. #14. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICAT |
|---|---|---|---|
| JAMES D. KOREN | 9-16-47 | 5546 | REACTOR OPER |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 7-12-74 | 10 MIN. CONTINUOUS | 8.8 | CHARGING REACTOR # 1 WITH 3133 |
| 7-18-74 | 10 min. Continuous | 5.4 | Bldg. I Reactor Room, Buta. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| James D. Koren | 9-16-47 | 5546 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 5.1 | Reactor Oper., Bldg. I Charging R #22, 4301. |
| 5-2-74 | 10 min. continuous | 34.8 | Bldg. I, Reactor Room W/R #5 containing setup 454, open & air horn on for 10 min. |
| 5-2-74 | 10 min. continuous | 7.0 | Bldg. I, Reactor Room W/R #5 containing setup 454, open w/air horn on 5 hrs. |
| 5-3-74 | 10 min. continuous | 13.6 | Building I Butaprene Reactor area. |
| 5-5-74 | 10 min. Continuous | 8.6 | Bldg. I, Charging 9300 batch to R #22. |
| 5-9-74 | 10 min. Continuous | 10.0 | Bldg I, PVC & Butaprene Reactor Rooms. |
| 5-10-74 | 10 min. Continuous | 21.7 | Bldg. I, Opened R #10 manhead after pulling thru 2 one inch bleed off valves for 5 min. |
| 5-11-74 | 8 Hr. | 10.0 | Bldg. I, Reactor Operator Buta. Side. |
| 5-12-74 | 10 min. Contihuous | 18.0 | Bldg. I, Reactor Room PVC Side. |
| 5-23-74 | 10 min. continuous | 8.9 | Bldg. I Charging 4301 to R-22. |
| 6-6-74 | 10 min. Continuous | 12.6 | Flushing R #20 after 9269A batch, using proper procedure, ie. 15 min. venting. |
| 6-10-74 | 10 min. Continuous | 9.8 | Charging 9282 batch to R #23. |
| 6-14-74 | 10 min. continuous | 6.4 | Charging R#21. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| William Korpusinski | 7-7-45 | Salary | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 9.2 | Maintenance Foreman, Bldg. II Relief area to Maintenance Office. |
| 6-13-74 | 10 min. Continuous | 9.1 | Bldg. II Relief area to Maint. office. |
| 7-16-74 | 10 min. continuous | 106 | Outside Bldg. II Between Bl. Tks. 214 & 225. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Donald M. Koval | 7-26-60 | 4756 | Janitorial |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-27-74 | 10 min. Continuous | 3.3 | Janitor Taken while cleaning Smoke area. |
| 5-5-74 | 10 min. Continuous | 1.0 | Cleaning Process Engineers Offices. |
| 5-10-74 | 10 min. Continuous | 4.6 | Cleaning in Rubber Lab. |
| 6-13-74 | 10 min. Continuous | 4.7 | Cleaning around Smoke area. |
| 7-17-74 | 10 min. Continuous | 12.6 | Sweeping Bldg. II Relief area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Leroy Kreider | | Salary | Foreman |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-1-74 | 10 min. continuous | 19 | Bldg. II, Foreman, taken at R #60-70 water meter. |
| 6-12-74 | 10 min. Continuous | 30.0 | Bldg. II, Foreman in Relief area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Metro Krisco | 12-19-47 | 5524 | Reactor Operator |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-26-74 | 10 min. continuous | 35 | Bldg. I, Charging R #6 |
| 4-28-74 | 10 min. continuous | 13 | Charging R #9 |
| 5-1-74 | 10 min. continuous | 8.8 | Do normal work in Bldg. I RR |
| 5-3-74 | 10 min. continuous | 30 | Do normal work in Bldg. I, Reactor Room. |
| 5-4-74 | 10 min. continuous | 251 | Charging R #4. Century readings 20-50 around R #4; 50-100 P.P.M. Mask Job. |
| 5-5-74 | 10 min. continuous | 17 | Flushing Reactor #10 Century = 15-20 |
| 5-7-74 | 10 min. continuous | 2.2 | Charging R #6. |
| 5-9-74 | 10 min. continuous | 70 | Charging R #9 (Century reading) (10-20) Talked with Metro and he couldn't understand how it could be that high unless got vapors when charging dry material to R #9. |
| 5-10-74 | 10 min. continuous | | Finished charging R #4 (head closed) Century = 8-30 |
| 5-12-74 | 7-8 Hrs. TWA | 9.3 | |
| 5-13-74 | 10 min. continuous | 42 | Charging R #15 (Century = 30-50) |
| 8-11-74C | 10 min. Continuous | 3.9 | Bldg. I charging R #5-head closed |

[illegible] Krisco | 12-19-47 | 5524 | Reactor Operator

| [illegible] TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| [illegible] | 10 min. continuous | 4.8 | Charging R11 |
| [illegible] | 10 MIN. CONTINOUS | 6.9 | BUILDING 2 REACTOR ROOM. |
| [illegible] | 10 min. continuous | 5.7 | Bldg. I, Reactor Room |
| [illegible] | 10 min. continuous | 9.4 | Bldg. I, Reactor Room. |
| [illegible] | 10 min. Continuous | 3.0 | Bldg. I, Reactor Room |
| [illegible] | 10 min. Continuous | 20.1 | Under Nozz. on PVC side, Bldg. I |
| [illegible] | 10 min. Continuous | 18.0 | Bldg. I, Reactor Room. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Charles Kulp | 10-16-52 | 5586 | Bagger |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. continuous | 0.1 | Drumming on Line 5. |
| 5-7-74 | 10 min. Continuous | 2.6 | Running saddle bagger FPC-9300 |
| 6-13-74 | 10 min. Continuous | 2.7 | Operating saddle bagger. |
| 7-15-74 | 10 min. continuous | 0.3 | Operating saddle bagger. |
| 7-16-74 | 10 min. continuous | 0.1 | Line 5. |
| 7-18-74 | 10 min. Continuous | 0.1 | Redry on Line 5. |
| 8-11-74C | 10 min. Continuous | 2.9 | L-5 (470) Drums |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| J. L. Kulp | 9-21-64 | 6013 | Maintenance |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-4-74 | 10 min. Continuous | 7.5 | Bldg. II, Reactor Level. Century = 20 P.P.M. |
| 5-5-74 | 10 min. Continuous | 11.5 | Same area. Century = 15 P.P.M. |
| 5-6-74 | 10 min. Continuous | 4.9 | Bldg. II, Stripper Level repairing drop valve on R #55. Century = 15 P.P.M. |
| 5-8-74 | 10 min. Continuous | 2.9 | Same area. Cleaning drop valve on R #64. Century = 15 P.P.M. |
| 5-10-74 | 10 min. Continuous | 13.5 | Same area. Working on drop valve and leg on R #57. Century = 20 P.P.M. |
| 5-13-74 | 10 min. Continuous | 0.8 | Same area. Cleaning Drop valve. Century = 10 P.P.M. |
| 5-14-74 | 10 min. Continuous | 4.6 | Same area, Taking dropleg off of R #66. Century = 10 P.P.M. |
| 5-15-74 | 10 min. Continuous | 7.5 | Same area, cleaning Ball Valve for R #50. Century = 12 P.P.M. |
| 5-16-74 | 10 min. Continuous | 11.0 | Bldg. II Reactor Level working on R #66 manhead. |
| 5-17-74 | 10 min. continuous | 24.0 | Bldg. II stripper level repairing 80 Homo. |
| 6-11-74 | 10 min. Continuous | 8.0 | Bldg. II, Reactor Level. |
| 6-27-74 | 4 hr. Periodic | 19.5 | Same area. |
| 7-16-74 | 10 MIN. CONTINUOUS | 30.0 | BLDG. 2 REACTOR LEVEL |

J. L. Kulp 9-21-64 6013

| | | | |
|---|---|---|---|
| 7-17-74 | 10 min. Continuous | 7.0 | Bldg. II, Reactor Level. |
| 7-19-74 | 10 min. Continuous | 16.5 | Bldg. II, Reactor & Stripper areas. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Elmer A. Kunkle, Jr. | 1-26-53 | 5571 | Trucker |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-29-74 | 10 min. Continuous | 0.4 | In Warehouse Only. |
| 5-5-74 | 10 min. Continuous | 1.9 | In Warehouse only. |
| 6-12-74 | 10 min. Continuous | 2.6 | In Warehouse only. |
| 6-14-74 | 10 min. Continuous | 2.6 | In Warehouse only. |
| 7-18-74 | 10 min. Continuous | 1.1 | Warehouse area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert F. Kunkle | 1-26-53 | 5572 | Janitorial |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-2-74 | 10 min.<br>Continuous | 23.0 | Janitor, cleaning in Bldg. I Reactor Room. R #5 open and air horn on 10 min. (Set up 454) |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Joseph W. Kusior | 4-16-47 | 5579 | Service & Utility |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 5-11-74 | 10 min. Continuous | 6.7 | Hand Trucking Trash to Dumpser @ B.T. #9. |
| 7-18-74 | 10 min. Continuous | 14.7 | Cleaning in R #55 after 6338 batch. |

4119

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Edward Kuterbach | 6-27-46 | 5686 | Relief Oper. |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-17-74 | 4 Hrs. | 9.8 | |
| 4-27-74 | 10 min. Continuous | 9 | Relief Oper., Bldg. I. Pumping 4414 from Str. 3 to Bl. Tk. 8. |
| 5-10-74 | 10 min. Continuous | 1.8 | Bldg. I, Relief Area, at desk. |
| 5-13-74 | 8 Hrs. | 9.6 | Bldg. I Relief Operator |
| 6-6-74 | 4 hr. TWA | 4.0 | Bldg. I Relief Operator |
| 6-10-74 | 10 min. Continuous | 12.8 | Pumping out Str. #3, 9282 and hosing down area around drop valve vent drum. |
| 7-12-74 | 10 MIN. CONTINUOUS | 5.4 | PUMPING OUT STRIPPER # 4, 965 |
| 7-26-74 | 10 min. Continuous | 5.1 | 1st floor Bldg. I |
| 8-8-74 | 10 min. Continuous | 1.8 | Pumping PL-3133 from Str. #6 |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| Robert F. Lanyon | 1-16-48 | 5528 | Centrifuge |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-28-74 | 10 min. Continuous | 1.6 | Centrifuge Oper., Bulk Area, At Panel board. |
| 5-12-74 | 10 min. Continuous | 3.3 | Bulk area, Standing at discharge of Line 12 Centrifuge. 9300 Type. |
| 6-12-74 | 10 min. Continuous | 0.9 | Stacking 167309 off saddle bagger, Bulk area. |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| M. LAPREZICSA | 6-17-74 | 1486 | SERVICE & UTILITY |

| DATE TESTED | TEST DURATION | P. P. M. | COMMENTS |
|---|---|---|---|
| 7-15-74 | 10 MIN. CONTINUOUS | 0.4 | BULK AREA CLEANING FLOOR |

| NAME | HIRE DATE | CLOCK NO. | CLASSIFICATION |
|---|---|---|---|
| John Larkin | 5-20-53 | Salary | Laboratory |

| DATE TESTED | TEST DURATION | P.P.M. | COMMENTS |
|---|---|---|---|
| 4-30-74 | 10 min. Continuous | Trace | Chemist, Analytical Lab |
| 7-18-74 | 10 min. Continuous | 21 | In Analytical Lab. |
| 8-12-74A | 10 min. Continuous | 7.8 | Working in Analytical Lab. |

INDUSTRIAL WASTE MONITOR — DATE 4-25-74

| CHEMICAL NAME | LEVEL | COMMENTS |
|---|---|---|
| 1) Outside, West | | |
| 2) Spray Dryer Hopper, 3 | | |
| 3) Spray Dryer Hopper, 4 | 6 | |
| 4) Overflow Drum, 4 | 6 | |
| 5) Overflow Drum, 5 | 15 | |
| 6) Spray Dryer Hopper, 6 | 20 | |
| 7) Bldg. I | | |
| a) Pump Out, PWC | 15 | |
| b) Pump Out, Data | 20 | |
| c) Stripper Level, PWC | 15 | |
| d) Stripper Level, Data | 20 | |
| e) Booster Level, PWC | | |
| f) Booster Level, Data | | |
| g) Vent, PWC | | |
| h) Vent, Data | | |
| 8) Outside, East | | |
| 9) Unloading Bldg., West | | |
| 10) Unloading Bldg., East | | |
| 11) Purification, West | | |
| 12) Purification, North | | |
| 13) Waste Reclamation Bldg. | | |
| 14) Effluent Trench @ Basin I | | |
| 15) Underground Pl. Thru., 5-10 | | |

| | LEVEL | |
|---|---|---|
| 26) Bldg. 11 | | |
| a) Aux. Cut, NW | 25 | |
| b) Aux. Cut, East | 30 | |
| c) Stripper, NW | 15 | |
| d) Stripper, East | 15 | |
| e) Tower, NW | 20 | |
| f) Tower, East | 25 | |
| g) Water Tower, South | 25 | |
| h) Water Tower, Center | 20 | |
| i) Water Tower, North | 20 | |
| j) Cyclone, North | 25 | |
| k) Cyclone, Center | 20 | |
| l) Cyclone, South | 15 | |
| 27) Bldg. 12 | | |
| a) Tank, Elev 23 | | |
| b) Tank, Elev 22 | | |
| c) Tank, Elev 21 | | |
| d) Scrubber, 23 | | |
| e) Scrubber, 22 | | |
| f) Scrubber, 21 | | |
| g) Tank | | |
| h) Burner, 21 | | |
| i) Burner, 22 | | |
| j) Burner, 23 | | |
| k) Duct | | |
| l) Duct Work | | |

WESTERLY WIND GUSTING UP TO 20 MPH. CLEAR.

CHECKED BIDDLER + BUDICK ON BLDG: 2 ROOF WORKING ON 45 BANK JET EXTENSION ≈ 15 FT. FROM NASH EXHAUST, GETTING CENTRIFUGE READING UP TO 100 RPM.

BHV = 10 RPM.

R.R.

PRODUCTION MONITOR

DATE 4-26-74

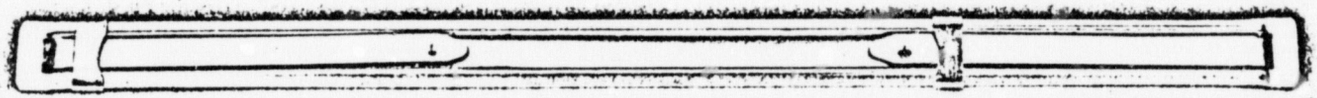
| CHEMICAL PLANT | LEVEL | COMMENTS |
|---|---|---|
| 1) Outside, West | | |
| 2) Spray Dryer Bagger, 3 | | |
| 3) Spray Dryer Bagger, 4 | | |
| 4) Overflow Drum, 4 | | |
| 5) Overflow Drum, 6 | | |
| 6) Spray Dryer Bagger, 6 | | |
| 7) Bldg. I | | |
| a) Pump Out, PVC | | |
| b) Pump Out, Buna | | |
| c) Stripper Level, PVC | | |
| d) Stripper Level, Buna | | |
| e) Reactor Level, PVC | | |
| f) Reactor Level, Buna | | |
| g) Vent, PVC | | |
| h) Vent, Buna | | |
| 8) Outside, North | | |
| 9) Unloading Bldg., West | | |
| 10) Unloading Bldg., East | | |
| 11) Purification, East | | |
| 12) Purification, North | | |
| 13) Waste Reclamation Bldg. | | |
| 14) Effluent Trench @ Basin 1 | | |
| 15) Underground Bl. Tks., S-20 | | |

| Well Designation | Level | Drawdown |
|---|---|---|
| (4) Unit 11 | | |
| a) Pump Out, PW | 1 - 1.20 | |
| b) Pump Out, Plant | 500 | — Note this was peak during pump out. |
| c) Sampler, PW | | |
| d) Sampler, Plant | | |
| e) Sampler, PW | | |
| f) Sampler, Plant | 25 | |
| g) Sampler, Plant | 40 | — Note outside air @ 70°F |
| h) Water Layer, South | 15 | |
| i) Water Layer, Center | 16 | |
| j) Water Layer, North | 18 | |
| k) Oil Layer, South | 25 | |
| l) Oil Layer, Center | 30 | |
| m) Oil Layer, North | 30 | |
| (7) Unit Area | | |
| a) Well, Unit 11 | | |
| b) Well, Unit 12 | | |
| c) Well, Unit 13 | | |
| d) Sampler, 10 | | |
| e) Sampler, 12 | | |
| f) Sampler, 11 | | |
| g) Well | 10 | |
| h) Sampler, 11 | | |
| i) Sampler, 12 | | |
| j) Sampler, 13 | | |
| k) Well | | |
| l) Oil Well | | |

L.D. Bay-

HYDROCARBON MONITOR DATE 7-27-74

| CHECK POINT | LEVEL | COMMENTS |
|---|---|---|
| 1) Catwalk, West | 7 | SOUTHEAST BREEZE. CLEAR. |
| 2) Spray Dryer Dagger, 3 | | |
| 3) Spray Dryer Dagger, 4 | | |
| 4) Overflow Drum, 4 | | |
| 5) Overflow Drum, 5 | 12 | LINE 7 SPRAY DRYER DAGGER = 10 |
| 6) Spray Dryer Dagger, 6 | 9 | |
| 7) Bldg. 7 | | |
| a) Pump Out, PVC | 15 | |
| b) Pump Out, Butadiene | | |
| c) Stripper Level, PVC | 20-150 | WHILE SAMPLING TWO 4414 BATCHES. |
| d) Stripper Level, Butadiene | 10 | |
| e) Reactor Level, PVC | 15 | |
| f) Reactor Level, Butadiene | | |
| g) Hose, PVC | 15 | |
| h) Hose, Butadiene | | |
| 8) Catwalk, East | 7 | |
| 9) Unloading Bldg., West | | 200 P.P.M. VI.CL. ON G.C. |
| 10) Unloading Bldg., East | | |
| 11) Purification, Desk | | |
| 12) Purification, North | 12 | |
| 13) Waste Reclamation Bldg. | 25 | |
| 14) Effluent Trench @ Basin 1 | | |
| 15) Underground Bl. Tks., S-10 | | |



CONTINUOUS TEN MINUTE AIR SAMPLES

FOR

PPM OF V/C (PERSONNEL MONITORING)

NAME 0003 Howard E. Hammen JOB FUNCTION "A" Operator 188-32-8212

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 5-03-74 | 10:30pm | 176 | Employee was attending to charts in Control Room | 4.0 PPM | 64/75 | |
| 5-03-74 | 6:30pm | 177 | Taken while in the reactor | 31.0 PPM | 68/70 | |
| 5-03-74 | 4:30pm | 178 | 2nd Floor-dropping a batch | 18.5 PPM | 69/68 | |
| 5-03-74 | 8:30pm | 179 | In front of reactor while dropping a batch. | 8.0 PPM | 66/75 | |
| 5-12-74 | 11:00am | 276 | Getting ready for reactor cleanup | 1.5 PPM | 67/93 | |
| 5-19-74 | 5:30am | 357 | Dropping a batch | 5.5 PPM | 63/93 | Wind-2mph Bmp-30.14 |
| 5-21-74 | 4:00am | 393 | Installing Blank in R418 charge manifold & removing SBP | 3.8 PPM | 54/83 | Wind-SSE 4mph Bmp 30.29 |
| 5-24-74 | 1:30am | 404 | Washing out S-425 | 8.3 PPM | | |
| 5-30-74 | 8:30am | 490 | Dropping batch from R-444 to S-424 | 1.4 PPM | | |
| 6-03-74 | 10:00pm | 505 | 2nd floor while preparing 401 for maintenance | 0.3 PPM | | |
| 6-12-74 | 10:45pm | 564 | Dropping and charging R441 to S-423 | 1.7 PPM | | |
| 6-28-74 | 8:00pm | 596 | Second Floor Poly Building Dropping batches | 2.55PPM | | |
| 7-18-74 | 11:10pm | 746 | Control Room and 401 area | .35PPM | | |
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| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 4-30-74 | 12:50am | 9 | Poly Building - Control Room | 26.5PPM | 63/78 | |
| 4-30-74 | 2:50am | 12 | Cleaning S.B.P. valve | 110 PPM | 62/78 | ReTest |
| 4-30-74 | 5:00am | 13 | Dropping and 2nd Floor poly bldg | 54.5PPM | 62/78 | ReTest |
| 4-30-74 | 6:50am | 15 | Dropping and 2nd floor poly bldg | 22 PPM | 66/68 | |
| 5-02-74 | 2:15am | 100 | Poly Building, 2nd floor dropping and charging | 17.5PPM | 54/38 | |
| 5-02-74 | 3:00am | 101 | Purging Reactor | 2.0PPM | 50/39 | |
| 5-02-74 | 4:20am | 102 | Dropping Batches | 3.5PPM | 47/35 | |
| 5-02-74 | 4:50am | 103 | Control Room | 8.5PPM | 46/35 | |
| 5-10-74 | 4:50pm | 270 | 2nd Floor Poly | < .1PPM | 74/39 | |
| 5-10-74 | 6:25pm | 271 | Control Room | < .1PPM | 72/38 | |

NAME C027 Helmuth P. Lingwai JOB FUNCTION "A" Operator 378-40-3668

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 4-30-74 | 8:30am | 12 | 2nd Floor poly building | | 79/45 | |
| 5-01-74 | 8:15am | 66 | 2nd Floor poly building | 20.5 PPM | 66/45 | |
| 5-01-74 | 9:00am | 67 | 2nd Floor poly building | 10.0 PPM | 57/42 | |
| 5-01-74 | 10:00am | 68 | 2nd Floor poly building | 0.5 PPM | 68/39 | |
| 5-19-74 | 5:15pm | 361 | Dropping | <2.5PPM | 66/63 | Wind-8mph BmP 30.0 |
| 5-19-74 | 7:00pm | 362 | Purged #445 | 5.0 PPM | 66/63 | Wind-8mph BmP 30.0 |
| 6-17-74 | 9:00pm | 581 | 2nd Floor poly building | 4.7 PPM | | |
| 6-17-74 | 11:00pm | 580 | 2nd Floor poly building | 5.0 PPM | | |
| 6-25-74 | 10:20pm | 586 | 2nd Floor poly building | 0.35PPM | | |
| 6-25-74 | 10:45pm | 587 | 2nd Floor poly building | 0.15PPM | | |
| 7-16-74 | 10:00am | 734 | 1st floor poly building | 3.7 PPM | | |
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NAME 0241 Warren Z. Reeves JOB FUNCTION "A" Operator 190-12-9917

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 5-08-74 | 8:40am | 222 | Dropping Batches | 5.0 PPM | 56/51 | Wind-16mph BmP 30.17 |
| 5-08-74 | 1:00pm | 239 | Blanking off reactor | 7.0 PPM | 62/48 | |
| 5-15-74 | 6:00am | 300 | Restarting B recovery | 2.0 PPM | 80/55 | Wind-8mph BmP 29.86 |
| 5-15-74 | 4:00am | 299 | Dropping Batches | 4.0 PPM | 63/87 | Wind-12mph SSW BmP 29.96 |
| 5-26-74 | 7:15pm | 429 | Charging | .2 PPM | 65/52 | Wind-7mph BmP 29.95 |
| 5-26-74 | 10:00pm | 430 | Control Panel | 3.9 PPM | 58/75 | Calm BmP 29.96 |
| 7-26-74 | 12:00am | 793 | Dropping Batches | 4.3 PPM | | |

NAME [redacted] Henry W. Milliner Jr. JOB FUNCTION "B" Operator 216-48-0221

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 5-09-74 | 11:00pm | 254 | Weighing up SBP | 1.5 PPM | 58/97 | |
| 5-09-74 | 10:40am | 255 | Charging R-422 | 4.2 PPM | 58/97 | Wind-calm BmP 29.91 |
| 5-22-74 | 1:00pm | 402 | Charging R-409 | 0.2 PPM | 82/63 | Wind-9mph WSW BmP 29.93 |
| 6-19-74 | 2:40pm | 612 | 2nd Floor poly-Charging &Dropping | 0.4 PPM | | |
| 7-24-74 | 12-8 | 620 | Charging a batch | 1.1 PPM | | |

NAME COPY Douglas B. Frey JOB FUNCTION "B" Operator 217-50-3882

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 5-01-74 | 4:45pm | 88 | Poly Building, 2nd floor Dropping and Charging | 34.0 PPM | 73/27 | |
| 5-01-74 | 6:20pm | 89 | Poly Building, 2nd Floor Dropping and charging | 6.0 PPM | 72/28 | |
| 5-01-74 | 8:45pm | 90 | Poly Building, 2nd Floor Dropping and Charging | 16.5 PPM | 61/43 | |
| 5-01-74 | 4:00pm | 91 | Poly Building, 2nd Floor Dropping and Charging | 18.0 PPM | 74/24 | |
| 5-07-74 | 5:00pm | 214 | Poly Bldg, 2nd Floor, Charging R-409, removing charge pot | 6.0 PPM | 57/34 | Wind-10mph Bmp 30.01 |
| 5-10-74 | 2:20pm | 260 | Cleaning Reactor | 6.0 PPM | 72/48 | Wind-13mph Bmp 29.89 |
| 5-16-74 | 11:00am | 336 | Dropping R414 | *4.0 PPM | 82/41 | Wind-6mph Bmp 30.11 |
| 5-20-74 | 12:30am | 378 | Dropping R415 to S-424 using C/R valve | 8.5 PPM | 59/83 | Wind-SSE 4mph 30.29 Bmp |
| 5-22-74 | 3:00am | 390 | Washing out S-416 | 20.7 PPM | 55/90 | (0) Wind Bmp 30.02 |
| 5-30-74 | 7:00pm | 488 | 2nd floor poly building R-419 to S-425 taken while dropping batch | 1.2 PPM | | |
| 6-03-74 | 6:00pm | 507 | While charging R-410 opening and closing valves | 2.1 PPM | | |
| 6-10-74 | 8:50am | 544 | Dropping Batch at R-414 | 5.8 Wastex 3.5 Lab | | |
| 6-26-74 | 5:00pm | 604 | Poly Bldg. 2nd floor charging R-415 | 1.2 PPM | | |
| 6-28-74 | 8:40pm | 598 | 2nd floor poly building-Charging | 2.85PPM | | |
| 7-19-74 | 8:00am | 748 | | .4 PPM | | |
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NAME Cl14 Charles E. Rhoades JOB FUNCTION "B" Operator 219-44-6189

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 4-29-74 | 6:00pm | 2 | Charging | 2.9 PPM | 86/29 | |
| 4-29-74 | 7:10pm | 4 | Charging | 0.6 PPM | 82/34 | |
| 4-29-74 | 8:00pm | 5 | Charging | 12.9 PPM | 75/43 | |
| 4-29-74 | 9:00pm | 7 | Charging | 1.0 PPM | 74/48 | |
| 5-08-74 | 8:30am | 221 | Charging | 3.0 PPM | 52/63 | |
| 5-08-74 | 1:00pm | 238 | Charging | 2.2 PPM | 62/48 | Wind-17mph Gusty BmP30.12 |
| 5-16-74 | 1:30pm | 312 | Removing Drop Spool | 13.3 PPM | 82/41 | Wind-6mph BmP 30.11 |
| 5-16-74 | 4:30am | 311 | Pumping out stripper | 2.4 PPM | 65/88 | Wind-5mph BmP 30.08 |
| 5-16-74 | 10:00am | 321 | Hooking up two V/C cars | *13.5 PPM | 78/38 | |
| 7-26-74 | 11:40am | 784 | Charging | 2.25PPM | | |
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NAME 0122 ROBERT E. OSBORNE JOB FUNCTION "B" Operator 233-58-8262

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 6-12-74 | 11:10am | 565 | Dropping & Charging R-416 to S-424 | 1.5 PPM | | |

NAME 0124 Roger D. Alley JOB FUNCTION "B" Operator 224-56-2172

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 4-29-74 | 6:00pm | 1 | Dropping and Charging | 2.6 PPM | 86/29 | |
| 4-29-74 | 7:00pm | 3 | Dropping and Charging | 2.2 PPM | 82/34 | |
| 4-29-74 | 8:00pm | 6 | Dropping and Charging | 14 PPM | 76/43 | |
| 4-29-74 | 9:00pm | 8 | Dropping and Charging | 0.5 PPM | 74/48 | |
| 5-17-74 | 7:00am | 342 | Charging | * <2.5 PPM . | 69/97 | Wind - 8mph WS BmP 30.01 |
| 5-26-74 | 9:25pm | 427 | Charging | 1.2 PPM | 65/52 | Wind-7mph BmP 29.95 |
| 5-26-74 | 8:05pm | 428 | Weighing SBP and Charging | 0.0 PPM | 65/52 | Wind-7mph BmP 29.95 |
| 5-27-74 | 9:15am | 433 | Charging | 0.2 PPM | 56/90 | Wind-5mph Bmp 29.93 |
| 5-24-74 | 4-12 | 403 | Charging | 11.0 PPM | 62/81 | Wind 5 mph BmP 29.83 |
| 5-24-74 | 4-12 | 407 | Charging | 2.8 PPM | 62/81 | Wind-5mph BmP 29.83 |
| 7-28-74 | 8-4 | 794 | Pumping out | 1.8 PPM | | |

ONLY COPY AVAILABLE

NAME Alfred E. Mirlidi JOB FUNCTION Operator

| Date | Time | Sample Number | Operation Performed | Test Result (PPM) | Temp/Hum. °F/% | Comments |
|---|---|---|---|---|---|---|
| 5-03-74 | 12-8 | 141 | 1st Floor Poly Bldg pumping out | 9.0 PPM | 47/98 | |
| 5-03-74 | 12-8 | 142 | 1st floor poly bldg pumping out | 3.7 PPM | 46/100 | |
| 5-03-74 | 12-8 | 143 | 1st floor poly bldg clng strainer | 7.5 PPM | 47/100 | |
| 5-03-74 | 12-8 | 144 | 1st floor poly bldg washing floor | 19.0 PPM | 47/100 | |
| 5-18-74 | 8-4 | 351 | Pumping out | * 4.5 PPM | 68/78 | Wind-7mph BmP 30.10 |
| 5-19-74 | 8-4 | 352 | Pumping out | * 3.2 PPM | 63/67 | Wind-8mph BmP 30.22 |
| 5-29-74 | 12-8 | 453 | Pumping out and filling out paperwork | 7.4 PPM | | |
| 5-29-74 | 12-8 | 454 | Pumping out and washing down 1st floor | 3.6 PPM | | |
| 7-20-74 | 8-4 | 618 | Pumping out | 3.0 PPM | | |

* Equipment difficulty occurred during sampling.

ONLY COPY AVAILABLE